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GUIDED MISSILE IMPLICATIONS

Eilene Galloway, The Library of Congress
Abridged by Major Nels A. Parsons, Jr., *Artillery*
Student, U. S. Army Command and General Staff College

The direction and the progress of development in the missile weapons field and, more important, the impact of these weapons on strategy, national policy, and military organization for defense are vital matters to the military planner today. "Guided Missiles in Foreign Countries," is the title of a new study prepared for the Armed Services Committee of the United States Senate by the Legislative Reference Service of The Library of Congress. The report, utilizing unclassified information published in six languages, describes the development progress in rockets and missiles made by various foreign countries to date and undertakes to analyze the implications of missile development for the pattern of future warfare, United States foreign policy, and defense appropriations. The report was prepared by Eilene Galloway, national defense analyst of the Foreign Affairs Division. The following abridgment of the complete study was produced for the MILITARY REVIEW *by Major Nels A. Parsons, Jr.,* Artillery, *author of the book* Guided Missiles in War and Peace. *In the interest of space economy, original sources of information listed in the pamphlet have been omitted.—Editor.*

THE purpose of this study is to survey the missile and rocket programs of foreign countries to determine how far they have progressed in developing advanced weapons which are revolutionizing the art of warfare.

The description of missile development in each of the foreign countries is based upon published information in documents, books, and periodicals which are unclassified.

No government, however, publicizes nearly as many details of its missile progress as the United States. Whereas historically it has been the usual policy of governments to conceal the existence of advanced weapons, it is now commonplace for the great powers to notify the enemy in advance of what he may expect in the way of retaliation if he launches an attack. A certain amount of publicity is a concomitant of a deterrent military force. How can an enemy be deterred unless he knows his adversary has such military might that he is afraid to start a war?

Foreign Countries

1. *Great Britain*

The vulnerability of the United Kingdom to rocket and missile attack became apparent during World War II when German *V-1* and *V-2* missiles caused extensive damage to densely populated areas. The development of the atomic bomb toward the end of the war, and the implications for the future of enemy attacks by missiles with nuclear warheads, gave impetus to a postwar development program which would meet Britain's requirements for defense.

Britain's needs are in contrast to those of the United States whose vast area makes it possible to organize a defense in depth with the possibility of using fighter interceptor planes and an early warning system that provides at least some margin of time. England is such a small country that the speed of jet bombers, not to mention missiles, offers no margin in depth of defense.

It would not only be easier for the Soviet Union to strike Britain than the United States, but such a possibility must be taken into consideration in making de-

fense plans because Britain, a deterrent base against the USSR, is therefore a target.

Even if long-range missiles are not actually used against England, their existence and the possibility that they might be used may be a sufficient threat to affect British policy. That such psychological pressure was the intent in the note addressed by Soviet Premier Nikolai A. Bulganin to Prime Minister Anthony Eden during the Middle East crisis, there can be no doubt. After referring, in a simultaneous note to President Eisenhower, to the fact that the Soviet Union and the United States are "the two great powers which possess all modern types of arms, including the atomic and hydrogen weapons," Premier Bulganin's note to the United Kingdom takes on special meaning:

In what position would Britain have found herself if she herself had been attacked by more powerful states possessing every kind of modern destructive weapon?

And there are countries now which need not have sent a navy or air force to the coasts of Britain but could have used other means, such as rocket techniques. . . .

British military policy is similar to that of the United States in emphasizing deterrent strength to prevent war as well as the capability of fighting successfully if an enemy attack is launched. The British missile program is developing within this concept of defense policy.

There was criticism from the opposition Members of Parliament of the delay in missile development, and the Minister of Defense answered this by explaining that the rapidity of scientific development was such that the Government had decided not to commit its limited resources to weapons that might be obsolete by the time they became operational. Instead, the plan was to take a longer time for research before going into full production. This explained why British development was behind that of the United States.

In February 1956, the Government's Statement on Defence reported the continued expansion of nuclear-weapon development, and that ballistic rockets as a deterrent to aggression were being emphasized. Progress in guided missile development is being made for the Navy, Army, and Air Force, and servicemen are becoming experienced in the use of these weapons by taking part in test trials. The program for the Navy provides for the installation of guided missiles in new cruisers and destroyers. The Army is receiving, in 1956, its first shipments of the United States *Corporal*, surface-to-surface guided missile, and plans are underway for training British soldiers in its use.

Five lines of development are currently being followed in the British missile program:

1. The intercontinental ballistic missile with H-bomb warhead, possibly atomic-powered, together with an interim ramjet bombardment missile having an atomic warhead if required.

2. One or two advanced ground-to-air weapons capable of shooting down supersonic aircraft.

3. A medium range ship-to-ship or ship-to-shore bombardment missile, probably with an atomic warhead.

4. At least two air-to-air missiles, one for intermediate use, and the other for such advanced fighters as the English Electric *P. 1.*, the Gloster *Olympus-Javelin*, and the Saunders-Roe *SR. 53* jet-plus-rocket type.[1]

5. An aircraft-to-ship antisubmarine weapon which will be the mainstay of Coastal Command's and the Fleet Air Arm's antisubmarine squadrons.[1]

On February 13, 1957, Mr. Sandys (Minister of Defense) explained that his task was "to reshape the forces, not to mutilate them," and that "any reductions we make

[1] In view of Great Britain's recent decision to discontinue all combat aircraft development and turn exclusively to missile artillery, the future of these lines of development is in doubt.—Editor.

must be part of a coherent plan and one which makes sense militarily as well as financially."

. . . it is quite clear . . . that ultimately the threat to this island will come not from manned bombers, but from nuclear ballistic projectiles. It is similarly clear that in the future the effectiveness of our deterrent power will also depend upon the possession by us of these weapons.

Subsequent to the Bermuda conference in March of this year press reports indicated: "Officials said the 1,500-mile range 'intermediate' missile without atomic warheads would be supplied to Britain. But the United States also will stock atomic warheads in Britain, keeping them under its own control, as required by law, except in event of war, when the President has authority to supply them to allied forces.

* * * * *

"The decision on missiles was linked directly to the Suez crisis and Soviet reaction to it. An official recalled Soviet threats to use guided missiles against Britain and pointed out that Britain at that time had no capacity to retaliate. Under the new plan, this official said Britain would be stronger and the presence of the guided missiles on that island—about 1,200 miles from Moscow—would be a deterrent to attack in the future."

2. *Australia*

Australia was able to provide a range of one million square miles, practically uninhabited, extending 1,200 miles northwest from Woomera to the Indian Ocean, and beyond that to Christmas Island, a total distance of 2,700 miles. Furthermore, a growing industrial potential was to be found in southeastern Australia.

By May 1953 it was announced that 440 guided missiles and 700 rockets had been set off at Woomera since 1950. Continuous testing was being made of ground-to-ground, ground-to-air, and air-to-ground weapons, and a total of 2,200 bombs had been dropped. It was also reported that a guided bomb was being developed. On July 21, 1953, Australian Supply Minister Howard Beale announced that atomic bombs would be tested by Britain at Woomera. Another large testing ground was later to become available at Maralinga in Western Australia.

3. *Canada*

Although most of the Commonwealth's research and development of guided missiles is being done by Britain and Australia, Canada has a program of her own which is directed toward capability to perform the air-defense mission. Study of the problem was begun in 1947 by the Defense Research Board, particular attention being paid to the development of a family of air-to-air missiles in line with cooperative arrangements made with the United Kingdom and the United States.

It seems probable that the Canadian program is more effective in producing skilled personnel in the armed services, in Government, and in industry, than it is in quantity production of missiles. Canada's close ties with the United Kingdom and with the defense system of the United States make it possible for her to rely upon the results of their operational missiles.

4. *France*

Guided-missile development in France during the last 10 years has not been accompanied by the degree of publicity which characterizes the United States program. It is perhaps natural that security checks are applied during a period of research and development. When positive results can be demonstrated, however, the public is usually informed of the major outlines of the achievement.

Recent information indicates that France has been engaged in producing all types of *engins spéciaux*—guided weapons: surface-to-air rockets, surface-to-surface missiles, air-to-air missiles, air-to-surface rockets, and target aircraft that can be guided by remote control.

The first operational ground-to-air missile, the *PARCA*, was developed for the French Army General Staff and the Armament Research and Production Directorate.

The rocket, launched by multiple boosters which fall off when the speed of sound is exceeded, continues to climb while guided by radio and controlled from a ground station. This antiaircraft rocket is reported to be capable of hitting enemy planes "at all altitudes," its warhead being equipped with a proximity fuse which detonates as the *PARCA* nears the target.

In the surface-to-surface missile class, the French are developing the *SE. 4200*, a ramjet missile launched by rockets from mobile ramps. Antitank rockets are also being produced: the *SFECMAS 5200*, the *ENTAC*, and the *SFECMAS 5210*. The first two of these rockets are limited in range by the length of wire carried in the fins. The *5210* has a longer range, however, and is being produced for the army as well as for the air force which plans to use the missile from the air against ground targets.

5. *Italy*

Italian scientists, industrialists, and representatives of the three armed services are cooperating in a missile program which is designed to keep Italy abreast of new weapon development. Lacking the large appropriations necessary for the production of significant numbers of guided missiles, Italy is devoting most of her effort to research and development at this stage. There is, however, a growing effort on the part of equipment needed for a guided-missile program.

6. *NATO*

Congress appropriated funds for Fiscal 1957 which may be used to equip our NATO allies with United States missiles. On March 19, 1956, President Eisenhower sent to the Congress his message on the mutual security program. In asking for funds to strengthen our allies with advanced weapons for defense, the President said:

I recommend that about $530 million be made available to enable the Department of Defense to begin a program of aiding our allies in developing an even more effective defense based on an improved and better coordinated early warning and communications system and utilizing advanced weapons systems, including missiles, *now being procured for our troops.*

These advance weapons, which are purely defensive in character, pose no threat to any nation which does not initiate aggression. They are designed, to give warning of, and repel, such aggression—and by their potential effectiveness to deter it.

Early in 1957 there were several significant developments in connection with the use of missiles by NATO. On January 16, the President sent his budget message for Fiscal 1958 to the Congress, and in the accompanying analysis of basic military missions, it was pointed out that—

A third mission is to maintain mobile and versatile forces suitably deployed and ready for immediate action in case of aggression. Army divisions are being reorganized into more flexible units supported with the latest atomic weapons and with aviation units. In addition, the Army will increase the number of atomic support commands[2] *which are particularly suitable as backup for the ground forces of allied countries.*

The analysis of current authorizations states that—

"These new atomic support commands are particularly suitable to provide atomic support for the forces of our friends and allies abroad."

It was reported that United States forces would be supplied with atomic weapons, that nuclear warheads would be

[2] Latest Nomenclature: United States Army Missile Commands.—Editor.

stockpiled and made available to NATO forces if an emergency arose, and that NATO instructors would be trained in the use of such weapons, including missiles. A program is being arranged by the Department of Defense to bring approximately 100 instructors to the United States from a number of Western allied nations so that courses of instruction can be given in the use of guided missiles.

7. *Sweden*

The Swedish Government has an extensive missile program to meet the requirements of the army, the navy, and the air force.

Financing for the research and development of missiles was included as part of the regular defense expenditures prior to 1954-55. At that time, however, it was decided to undertake the development of a high altitude interceptor missile, and the Air Force was allocated Sw. Kr. 25 million for that purpose. Between 1960 and 1965, Sweden plans to spend Kr. 600 million for new weapons—approximately $120 million—"believed to include mainly missiles."

The new air defense missile is reported to have a range of from 120 to 150 miles and to be somewhat more complicated in design than the United States Douglas *Nike*.

Probably the most significant point to add is that Sweden has the capability of equipping missiles and rockets with nuclear warheads. The industrial capacity and the scientific knowledge and manpower are available to develop atomic energy.

8. *Switzerland*

Switzerland's requirement for guided missiles stems from her national-defense needs in an atomic era. Continuation of the traditional policy of armed neutrality as a defense against all possible contingencies means that Switzerland must keep up with military developments which are taking place in other countries. Being a neutral nation, Switzerland does not wish to participate in alliances and military agreements, holding that the best defense lies in a guarded frontier, a mobile army, a home guard, and an air defense against attacks by planes or missiles. Aerial defense cannot be achieved by fighter-pursuit planes because of the small size of the country, and, therefore, it was natural that attention should be directed toward the development of guided missiles and rockets. The combination of skilled scientific manpower with the high level of Swiss industry resulted in the development of a successful ground-to-air missile.

The type *54* antiaircraft missile was produced by the Oerlikon Machine Tool Works, Buhrle & Co., which is located in Oerlikon, a suburb of Zürich. Unlike the closely guarded secrets of Government programs which at most publish pictures and general descriptions of new missile types, the Oerlikon Co. has had public displays of a complete antiaircraft missile system and has released technical engineering descriptions, pictures, and charts of its precision weapons. The ammunition necessary for these weapons is also produced by the Oerlikon Co.

The Swiss rocket and missile program is a private enterprise rather than a Government program, although production is designed for antiaircraft units of the Swiss Army.

"It is not stated whether the Swiss Government are prepared to export the weapon; if they are, it would seem that this will be the first missile capable of being bought 'over the counter'."

9. *USSR*

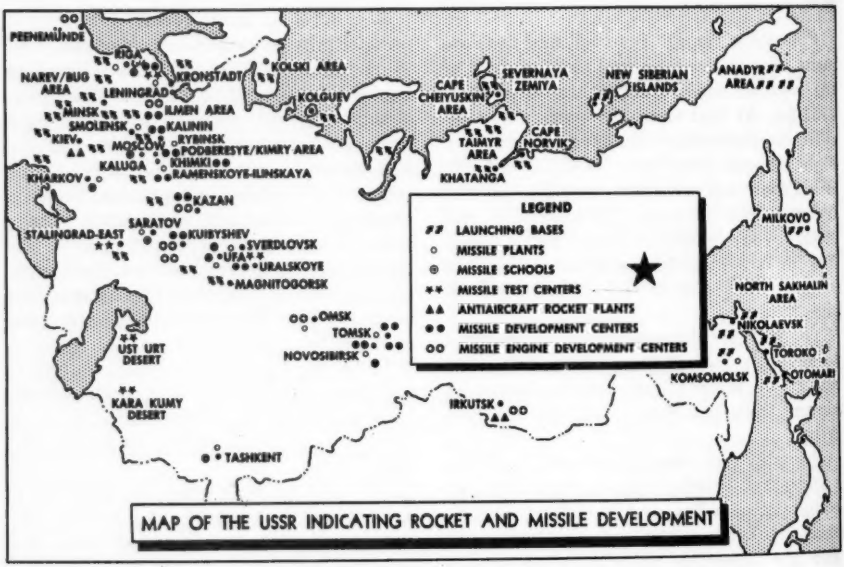
At the end of World War II the Soviet Union and the Western Allies came into possession of Germany's program for rocket and missile development. There was an agreement for mutual inspection of such programs and, as matters fell out, more than 200 German scientists came to the United States, among them some outstanding missile experts. The United States also obtained about 100 *V-2* mis-

siles, many of which were tested later on the White Sands range. The Soviet Union, however, took over not only about 80 percent of the German aircraft industry in East Germany, but also all types of missiles, plans, plants, testing centers, and key scientific personnel that had been engaged in producing *V-1* and *V-2* rockets for the war. Altogether 160 German rocket experts went to work for the Soviet missile program which was given top priority by Stalin.

By adding advanced German rocket development; and, above all, a determined drive by the Government to succeed.

Whereas the United States guided-missile program has been accompanied by official publicity on appropriations, personnel, location of research and production centers, photographs and exhibits of new weapons, the USSR has maintained a policy of secrecy broken by a few official announcements.

In February 1956 Marshal Georgi K. Zhukov, Soviet Defense Minister, addressed the 20th Communist Party Congress in



MAP OF THE USSR INDICATING ROCKET AND MISSILE DEVELOPMENT

velopment to the Russian program which had started before World War II, and indeed can be traced back 50 years as far as basic research is concerned, the Soviet Union was in a strong position to forge ahead. All the requirements for attaining a predominant position in this missile field were present: technicians and scientists with ideas; excellent research laboratories; factories to produce precision instruments; testing grounds and equip-

Moscow, stating that the Soviet armed forces had been "completely transformed" since World War II, and that the Soviet Union already had "diverse atomic and hydrogen weapons, powerful rocket and jet armament of various kinds, including long-range rockets."

The administration of the rocket and missile program is in a special department under the Ministry of War. Headed by an army artillery expert, Marshal N. D.

Yakovlev, this department has jurisdiction over top-level research and development projects including thermonuclear weapons and cosmic ray research. Whether or not Marshal Yakovlev has charge of production as well as research is not known; the usual Soviet practice is to separate the administration of such projects.

Some of the most detailed and up-to-date information on the Soviet missile program has been written by Richard E. Stockwell in his book, *Soviet Air Power*, published in 1956. Mr. Stockwell is consultant to the aircraft gas turbine division of the General Electric Company, Cincinnati, Ohio.

In comparing the missile development of the United States with that of the Soviet Union, Mr. Stockwell gives this estimate:

Available information indicates the Soviets have fewer missiles in production but more under development than the United States. And they have in mind to use them in about as many different ways as the United States.

Air-to-air missiles.—The German *R4/M* rocket has been converted and improved for use on Soviet fighters, and has been seen on *MiG-15's* and is "thought to be on some Soviet all-weather interceptors."

Air-to-surface missiles.—The *RS-82* is an 82-millimeter rocket made to fire from planes to ground targets, but it "may now be obsolete." An antitank rocket of 55 pounds is made for use against heavily armored weapons. The third known type is the *M-100*, a 154-pound weapon which is lifted by plane before it is fired.

Surface-to-air missiles.—There are at least seven types of antiaircraft missiles, four representing the improvements on original German designs. The *Rheintochter*, probably used to defend Moscow against enemy planes, was originally designed for guidance by radar and radio, but it is now likely that the missiles are guided by built-in radar devices.

The Soviet *C-2* is an advanced version of the German *Wasserfall* which was large enough to destroy bombers flying in formation. The *C-2* has a thrust of 17,000 pounds and can attain an altitude of 50,000 feet flying as fast as 1,200 miles per hour. These missiles afford additional protection to Moscow.

Three new versions of the former German Henschel *HS-117*—the *Butterfly*—have been developed with different types of power: a *BMW* rocket engine, a Walter *HWK-109-729* engine, and a ramjet powerplant. The latter has automatic firing and can fly 600 miles per hour.

One surface-to-air missile is similar to the United States Boeing *GAPA* missile and was developed from the original German *Taifun* (typhoon). This missile can fly up to 50,000 feet at a maximum rate of 2,700 miles per hour. It is possible that either the *Taifun* or the *C-2* is used by the Soviet Navy for antiaircraft protection; at any rate, the new cruiser, the *Sverdlov*, was observed to have missile protection when it docked in England for the coronation of the Queen.

Another surface-to-air missile is similar in profile to the *102A* interceptor built for the United States Air Force by the Convair division of General Dynamics Corp. It has been reported that the Soviet type has an altitude of over 75,000 feet.

Underwater-to-surface missiles.—These are being developed for use by long-range submarines against cities located along seacoasts. It has been reported that this missile can be sent to a target 140 miles distant and that it has been fired from 300 feet below the surface of the sea.

Surface-to-surface missiles.—The Soviet Army has a 200-mile range tactical missile (an improved version of the German *A-4* or *V-2*) which can be launched from a mobile base. The *C-2*, with a 35- to 40-mile range, can also be fired from mobile equipment. The fact that the *C-2* can be used both as a surface-to-surface as well as a surface-to-air missile is evidence of the manner in which the Russians have

simplified their problems of engineering and manufacturing.

A 530-mile range missile for tactical purposes has been developed by adding wings to the German *A-4* missile. Two surface-to-surface ramjet missiles have been counted as part of the arsenal. There is also said to be a lorin type ramjet missile which is fired from heavy artillery.

Intercontinental ballistic missiles.—It is not known how long the Soviet Union has been working on an ICBM, but the basis for such a missile was worked out by the Germans at Peenemünde in plans for the *A-10*. An improved *A-10*—the *M-103*—was designed at Khimki, a research center near Moscow.

"Its calculated range is about 3,500 miles. Whether or not it has been tested isn't known. [According to Stockwell.]

"However, the numerous missile facilities along the USSR's northern fringes, within the Arctic Circle, suggest a very long-range missile test range rivaling USAF's Missile Test Center that extends into the South Atlantic from Cape Canaveral, Fla., or the British facilities at Woomera, Australia.

"That the Soviets haven't been quite as successful with guided missiles as they have been in the development of aircraft and aircraft engines is indicated by the available evidence. Not only have many of the German missile experts been kept in the USSR, but control and guidance techniques are known to plague the Soviets in much the same way they have slowed missile progress in the West."

One of the most informed writers on Soviet missile progress is Dr. Walter R. Dornberger who was the German major general in charge of the Army Missile Experiment Station at Peenemünde during World War II. Following the war he came to the United States where he took out citizenship papers and became missile consultant of the Bell Aircraft Corp., Buffalo, N. Y.

Dr. Dornberger estimated that both the Soviet Union and the United States started from "the same level of inexperience" after the war, but pursued different lines of development. The Soviet Union reassembled and relocated German missile facilities and began producing them for the army, whereas the United States spent more time on the research and development base of a modern weapons system.

In an article on the State of the Art published in June 1956, Erik Bergaust has described Soviet missile progress in comparison with that of the United States. Mr. Bergaust, managing editor of *Missiles and Rockets*, thinks that as a result of working with the German *V-2's*, the Soviet Union may have had more experience than the United States in operating ballistic missiles, but that—"it is presumably safe to say that the United States is still ahead of the Soviet as far as missile technology, production, and electronics are concerned."

Alfred J. Zaehringer, president of the American Rocket Co., Wyandotte, Mich., has recorded the rapid progress being made by the Soveit Union in the production of missiles.

Large motors powered with composite propellants have resulted in a weapon which combines—"the simplicity of the *Honest John* (solid propellant) and the range of the *Corporal* (liquid propellant). This Soviet missile is particularly suited for use in the Arctic."

"The country (the Soviet Union) now has at least four naval attack fleets; each fleet is equipped with 800 to 900 jet aircraft and 90 missile launching submarines. It also has 370 to 400 submarines, 150 of which are long-range types. One missile-carrying submarine is being launched each week."

IMPLICATIONS

The development of rockets and missiles by an increasing number of countries is one of the factors in the problem of averting war and preserving world peace. The new elements that have been added to the weapons of warfare, rendering the prob-

lem of control more acute, are the combination of nuclear warheads with missiles which have increased in speed and range, and the advances of electronics which make it possible to guide missiles to targets with increasing degrees of accuracy. Problems are being created which have implications for the pattern of future warfare, United States foreign policy, and defense appropriations.

Implications for Future Warfare

The dimensions of the problem that seemed grave enough when manned bombers could deliver the first atomic bombs in 1945, have burst their bounds with the prospect of an intercontinental ballistic missile that can travel 5,000 miles in 30 minutes, carrying a hydrogen bomb capable of demolishing a city. It is the prospect of this weapon, as well as the intermediate range missile of 1,500 miles or more, that complicates the control of forces that make for peace or war.

We must assume, of course that the enemy can also develop antimissile missiles to the extent that they are possible, and this probability has grave implications for the composition of the Air Force: at what date would it be feasible to substitute guided missiles for manned bombers that cannot be expected to reach their targets; and to what extent can missiles be made as accurate as bombers in hitting specific targets? In other words, to what degree, and by what time, can guided missiles be expected to achieve the mission which the Strategic Air Command is now prepared to fulfill with piloted aircraft? At present, the concensus of opinion is that military preparedness requires both weapons; the ICBM and IRBM could be used against large immovable targets where coordinates at launching and delivery points can be accurately determined; piloted aircraft could be used against pinpoint or small moving targets where the pilot's judgment at the time of action and the maneuverability of the plane are essential to success.

Military strategy is less likely to be affected by the advent of guided missiles than tactics. The national policy of the United States, and the policy upon which our Western alliance is built, would still emphasize deterrent military strength; the main objective would remain the prevention of war, but if one were started by an enemy, we would have the capability for massive retaliation as well as defensive strength designed to ensure our survival. The price in mutual devastation could be even higher with ICBM's and IRBM's than with hydrogen bombs delivered by bombers. The essential change is in the vehicle for delivery of a nuclear bomb, a change from fast high-altitude bombers to guided missiles that are even "faster, higher, and hotter." All the analyses that were made of the strategic implications stemming from the combination of nuclear bombs with long-range bombers are still valid as applied to warfare with guided missiles. These analyses stress the fact that if both the United States and the USSR possess the means of delivering hydrogen bombs on each other, the result will be a stalemate—a balance of power based upon fear of the awful consequences of a total thermonuclear war. If the stalemate were actually broken by such a war, then the methods of warfare—whether manned bombers or guided missiles are used—could not bear a relationship to any tenable political objective; the result would be mutual suicide.

There is one element that could change the strategy that now relies upon deterrence and the capacity for retaliation. If an enemy of the United States were substantially ahead in achieving operational ICBM's and IRBM's, the weapons could be used for blackmail, particularly if this happened before antimissile missiles were developed and perfected. The United States is deterred from starting a war by the national psychology of the people,

their democratic institutions, the objective of settling international disputes through the United Nations, or by other peaceful means; it is not necessary for an enemy to have superior military force to deter the United States from going to war. When the United States had a monopoly of the atomic bomb, it was international control, not aggression, that was sought. But if the United States should lose its superior military position, there would no longer be a deterrent force in the sense that a powerful enemy would have much to fear. It is for this reason that the guided-missile program in the United States is being given top priority.

ICBM's and IRBM's are not all-purpose weapons which wipe out the need for other methods of warfare; indeed, sole reliance upon them would predetermine the pattern of hostilities and lead to the very kind of annihilating war we are seeking most to avoid. Furthermore, it is most unlikely that one type of weapon would replace a weapons system in its entirety. If a war had to be fought, it would probably be with something old and something new, and with whatever equipment was available to the forces-in-being when the first shot was fired.

Implications for United States Foreign Policy

The development of rockets and missiles by foreign countries creates a situation which must be taken into account by those who are dealing with the implementation of United States foreign policy. If peace is to be maintained; if war is to be prevented; if armaments are to be controlled; if international conflicts are to be settled by the United Nations; then the relation of these objectives to the fact that the most advanced weapons of warfare are becoming available to an increasing number of nations takes on special significance.

The missile race has political and military implications which are bound to affect the foreign policy of all nations concerned, particularly the military base system of the Western alliance. This situation has been analyzed by the Interavia Study Group according to five hypotheses.[3]

The first hypothesis:

Supposing that Russia is the first to perfect a missile with atomic or thermonuclear warhead, a range of 1,200 or 1,500 miles and adequate precision of aim, over this range, allowing for the radius of destruction of the explosive carried.

In this event, not only Europe would be threatened by Soviet missiles, but also non-Communist Asia if the Russians permitted their use by Communist China. All airbases of the Western Nations, except those located in the United States, would be vulnerable to such a missile attack, and the serious nature of this situation is evident from the fact that a high percentage of the planes in the Strategic Air Command have a range which makes them dependent upon bases around the periphery of the Communist nations or upon being refueled while in flight. The Soviet Union would have an important but not decisive military capability; even though they might destroy advanced western bases, the Strategic Air Command could operate from the United States and the Navy could perform its strategic mission from carriers. The political consequence of the hypothesis, however, could be even more severe: threatened nations might feel there was no use in trying to build a defense against a downpour of missiles; if they were fired rapidly, many would get through despite radar warning nets, fighter planes, and the kind of surface-to-air missiles that are now available. Such a threat might tend to promote the growth of neutralism and thus affect military plans based upon strong and loyal alliances.

[3] The Intercontinental Ballistic Missile Will Change Tactics but Not Strategy. By Interavia Study Group, Interavia, Vol. 11, June, 1956, pp. 408-412.

The second hypothesis:

In this case the Western bloc is assumed to have gained the lead.

If the United States develops IRBM's with nuclear warheads and a dependable degree of accuracy, it would be in a position to attack the most vulnerable targets in the USSR and China; provided, of course, that the base structure holds firm. Whereas the Soviet Union could not knock out the SAC retaliatory capability with intermediate range missiles, the reverse would be true if the United States had them. The United States has a defensive military policy and will not use its weapons unless an aggressor starts a war, but a decisive lead in the IRBM field would tend to strengthen western diplomacy.

If a situation developed that conformed to either the first or the second hypothesis, one nation or the other would gain or lose various military advantages, but neither would be in such a strong position as to change the balance of power.

The third hypothesis:

Assuming the Soviet Union succeeded, before the United States, in developing, testing, and producing a substantial number of intercontinental missiles with atomic warheads.

The Soviet Union would then have an offensive force which could attack any target in the world. Even so, the United States would still have a strong force of manned bombers in SAC and the Navy, sufficient perhaps to deter aggression because the enemy could not be sure of destroying all United States strength at the outset of a war. The balance of military force would be similar to that which exists today.

The fourth hypothesis:

If the United States were the first to prepare a stock of ICBM's, the instruments of a policy of deterrence would be strengthened.

It would no longer be necessary to depend so much upon bases outside United States territory. Otherwise, the situation would be similar to that which existed from 1946-50 when the United States had a monopoly of the atomic bomb; the weapon had its chief use when it was not used, i. e., when it was a deterrent rather than a destructive explosion. Even with the ICBM, the Western Nations would probably find it desirable to maintain deterrent forces near the periphery of the Communist bloc.

The fifth hypothesis:

Development of an almost 100 percent effective antimissile.

If such a scientific breakthrough occurred, it would change the estimated consequences of the first four hypotheses. An aggressor would no longer fear retaliation because invading forces of planes or missiles could be destroyed before reaching their targets.

Then, and then only, not the absolute weapon, but the absolute weapons system would have been found. The first side to possess it would have a lever not just capable of lifting the world but of imposing its laws upon it.[4]

An analysis of the line of reasoning followed by the Interavia Study Group reveals that in both the first and second hypotheses an assumption has been made which affects the conclusions, namely, that the IRBM would be fired from land bases. If IRBM's could be launched only from the land, the conclusions would still be valid—that the Soviet Union could not knock out SAC retaliatory capability with intermediate range missiles, whereas the United States could hit targets within the Communist bloc. It has recently been brought out by Under Secretary of the Navy Gates, however, that ships for launching IRBM's are now being developed. In a speech delivered on November 16, 1956, Secretary Gates said:

The difficulties of handling modern weapons at sea are being overcome. They are not as complicated as resolving the

[4] Ibid., p. 412.

political problems of maintaining bases in foreign territories or as fraught with the dangers which come from relying on striking power primarily launched from within our own land boundaries.

This is an interesting example of the manner in which a technological advance can affect and alter military planning and political thinking. A sea-launched IRBM has implications for land bases as well as for estimates of an enemy's capability of carrying on a war. If the Soviet Union, with its present naval strength of 400 and more submarines, should develop nuclear submarines equipped with IRBM missiles, the United States would be just as vulnerable as if Russian ICBM's were stockpiled and operational.

Whether defense or retaliatory capability is considered, the development of all types of missiles, and even their eventual substitution for some percentage of the manned bomber force, would seem to emphasize the desirability of retaining the military base structure of the Western alliance as long as possible. Bases represent one way in which the Western Nations present a united front to the Communist bloc. Withdrawal from bases, whether they are in the form of long runways for bombers or consist of the less easily recognized missile ramps, would leave the nations of Western Europe an easy prey to blackmail from a country that has already developed rockets and missiles with nuclear warheads.

One last point may be made in analyzing the implications for foreign policy of guided missiles. They are extremely expensive weapons, and yet they do not solve, nor can they be used in, many international situations which threaten to disrupt the peace. They cannot be used as a tool for fashioning compatible relations in trouble spots such as those of the recent past and present: Cyprus, Algeria, Poland, Hungary, and the Suez Canal. Guided missiles are, however, part of the deterrent strategy which seeks to prevent war.

Implications for United States Defense Appropriations

Guided and ballistic missile developments abroad have already affected both the amount of money and the priority that has been given to the United States program. The special assistant to the Secretary of Defense for guided missiles, E. V. Murphree, has repeatedly warned that—

"The missile developments [program] is going to cost a lot of money but it is and will add great potential to the national defense."

The development and operational use of missiles has been given top priority by the Department of Defense.

Recent Official Statements by the Soviet Union, United States, and United Kingdom

International political developments relating to guided missiles in foreign countries occurred toward the end of March and in early April 1957. Their pertinence to the sections of this report which deal with Great Britain, NATO, Sweden, the USSR, and the implications for United States foreign policy will be readily apparent.

On March 26, 1957, a letter was received by Premier Einar Gerhardsen of Norway from Premier Nikolai A. Bulganin of the Soviet Union. Terming the international situation acute because "new attempts are being made to revive the cold war," Premier Bulganin wrote as follows:

* * * * *

The United States Government has not tried to hide its intention of using its armed forces in the Near East. Plans were made known not long ago for the stationing of American special troops, equipped with atomic weapons, on the territories of a number of states, and primarily on the territory of NATO members, and also we have the NATO decision to equip the West German Army and the armies of certain

other members of this military group with atomic weapons.

Of course, such actions cannot but increase the danger of a new war, and that is their intention, for a policy aimed at peaceful coexistence and international relaxation of tension does not satisfy everyone, it would appear. . . .

* * * * *

The Soviet Union has no intention of attacking anyone, but obviously, in response to aggressive actions against the Soviet Union, we would be forced to undertake the most energetic measures in order to inflict a destructive blow against the aggressor and also against the bases which are located near our borders.

* * * * *

The originators of these criminal plans still hope apparently that they will be able to keep out of range, thanks to the great distances, and that the whole force of the modern weapons' destructive might would fall on those countries supposed to serve as springboards of the attack against the Soviet Union and other peace-loving countries. But such hopes are groundless today.

The development of military techniques, particularly the rocket technique, means that today on our planet there no longer exists any distance which cannot be covered by the most modern types of weapons.

It is not difficult to imagine to what a dreadful danger Norway is exposing herself by the fact that her territory is utilized by certain big power aggressive circles to set up military bases against the Soviet Union. The destructive power of modern weapons is so great that the blow which would be directed toward destroying the aggressors' bases would inevitably hit much greater areas, which would mean a catastrophe even for countries with a larger territory than Norway. The truth of this appears from the tests made, which show that one hydrogen bomb can produce destruction within a radius of up to several hundred kilometers. One might ask what would happen if several such bombs were used. [*Emphasis supplied.*]

President Eisenhower commented on recent Soviet threats at his usual news conference on March 27, 1957:

We recognize that any nation in the world has a right to take such measures as it deems necessary for its own security and defense. I think the statements of the Russians are completely indefensible, and while I know of no specific purpose or plan that leads to this particular charge they are making and their particular threats, as you call them, that they are making, the right of Norway to take any measure it pleases within its own country for its own security certainly is clear.

And I might point out that when I went to Europe in 1951, in December 1950, that the same charges and same threats were made at that moment.

On April 4, 1957, a new British defense policy was outlined in a white paper issued by the Minister of Defense, Duncan Sandys. He explained the factors which led to the defense plan which was characterized as "the biggest change in military policy ever made in normal times."

Need for New Approach

" . . . the time has now come to revise not merely the size, but the whole character of the defense plan. The Communist threat remains, but its nature has changed; and it is now evident that, on both military and economic grounds, it is necessary to make a fresh appreciation of the problem and to adopt a new approach towards it.

Scientific Advances

"4. In recent years military technology has been making dramatic strides. New and ever more formidable weapons have been succeeding one another at an increasing rate. In less than a decade, the atom bomb dropped at Hiroshima has been

overtaken by the far more powerful hydrogen or megaton bomb. Parallel with this, the evolution of rocket weapons of all kinds, both offensive and defensive, has been proceeding apace.

"5. It has been clear for some time that these scientific advances must fundamentally alter the whole basis of military planning. But it is only now that the future picture is becoming sufficiently clear to enable a comprehensive reshaping of policy to be undertaken with any degree of confidence.

* * * * *

Nuclear Deterrent

"12. It must be frankly recognized that there is at present no means of providing adequate protection for the people of this country against the consequences of an attack with nuclear weapons. Though, in the event of war, the fighter aircraft of the Royal Air Force would unquestionably be able to take a heavy toll of enemy bombers, a proportion would inevitably get through. Even if it were only a dozen, they could with megaton bombs inflict widespread devastation.

"13. This makes it more than ever clear that the overriding consideration in all military planning must be to prevent war rather than to prepare for it.

"14. While comprehensive disarmament remains among the foremost objectives of British foreign policy, it is unhappily true that, pending international agreement, the only existing safeguard against major aggression is the power to threaten retaliation with nuclear weapons.

* * * * *

Europe and Atlantic

"20. The possession of nuclear airpower is not by itself a complete deterrent. The frontiers of the free world, particularly in Europe, must be firmly defended on the ground. For only in this way can it be made clear that aggression will be resisted.

"21. Britain must provide her fair share of the armed forces needed for this purpose. However, she cannot any longer continue to make a disproportionately large contribution.

* * * * *

Research and Development

"58. If the weapons and equipment of the armed forces are to be kept up to date, an adequate effort on research and development must be continuously maintained. However, in view of the shortage of scientists and technicians in civil industry, it is important to restrict the military programme to those projects which are absolutely essential.

"59. A central feature of the defence plan is the maintenance of an effective deterrent. High priority will therefore continue to be given to the development of British nuclear weapons suitable for delivery by manned bombers and ballistic rockets. Nuclear warheads are also being evolved for defensive guided missiles.

"60. The close cooperation with the United States over research on guided missiles and ballistic rockets, initiated under the agreement of 1953, has proved of mutual benefit to both countries and will be maintained and further developed. . . .

"61. Having regard to the high performance and potentialities of the *Vulcan* and *Victor* medium bombers and the likely progress of ballistic rockets and missile defence, the Government have decided not to go on with the development of a supersonic manned bomber, which could not be brought into service in much under 10 years.

"62. Work will proceed on the development of a ground-to-air missile defence system, which will in due course replace the manned aircraft of Fighter Command. In view of the good progress already made, the Government have come to the conclusion that the RAF are unlikely to have a requirement for fighter aircraft of types more advanced than the supersonic *P. 1.*, and work on such projects will stop."

GUERRILLA WAR IN GREECE, 1946-49
A Case Study

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What terrible rulers the Russians would be if ever they should spread the might of their rule over the countries of the south. They would bring us a polar despotism, tyranny such as the world has never known, silent as darkness, rigid as ice, insensible as bronze, decked with an outer amiability and glittering with the cold brilliancy of snow, a slavery without compensation or relief.

—Journal of Henri Frédéric Amiel
July 1, 1856

TEN years ago the Soviet Union, through the Communist Party of Greece (KKE), turned to military pressure in an attempt to extend its influence and control to the Mediterranean. Had the effort been successful, a satellite Greece would have appeared in the Soviet orbit and a centuries old dream of Russian rulers—outflanking the Turkish Straits—would have been realized. In addition, Crete, the largest of the Greek Islands, occupying a strategic position in the eastern Mediterranean 200 miles off the North Africa Coast, would have provided an excellent base for continued unconventional warfare operations against the Middle East complex.

Other than its geographical position, Greece possesses none of the elements which a foreign power could consider as valuable war potential. Natural resources are largely undeveloped and limited in variety, while Greek industrial capacity is small and, by western standards, technologically backward. The land area, about 50,000 square miles, is only one-fourth arable and is insufficient to support the population of under eight million.

The Rugged Arena

Terrain, which is an influencing factor in any type of military operation, is of critical importance in the conduct of guerrilla warfare. Craggy, mountainous terrain with crude roads and poor communications is ideally suited for guerrilla operations. Forests, swamps, jungles, marshes, and similar geographical features which reduce the mobility of and hamper control by conventional forces provide the required protection and strongholds for guerrilla units. In areas of this type heavy weapons, artillery, and air support are considerably reduced in effectiveness.

The mountains of Greece cover more than two-thirds of the mainland and in normal times are the homes of about 40 percent of the population. The remainder of the population is concentrated in cities with about one-seventh of the entire population living in the Athens-Piraeus area. There are no large towns in the mountain areas, but the land supports small groups in widely separated villages. Few areas are uninhabitable for there is usually grazing for sheep and goats, and from these

In addition to the pressure exerted by Greece, by her army, and by her allies, the Greek Communists contributed to their own military downfall through operational blunders and serious psychological errors

animals and the poor soil the mountain dwellers eke out a bare existence.

Of the major mountain masses in Greece, the Pindus range, extending from the Albanian frontier southeastward to the Gulf of Corinth, forms the central core and largest area of sparse population.

The second important massif, the Kaimakchalan-Vermion-Olympos, runs in a semicircular arc along the western coast of the Gulf of Thermai (Salonika). The third is the southern end of the Rhodope range, which lies between the Strimon and Nestos Rivers in Macedonia, and drops sharply to the plains bordering the Aegean Sea south of Bulgaria.

The interior road net in Greece is a primitive one. Consequently, the towns guarding the mountain passes are of special importance in the planning and execution of operations. Examples are Métsovon, which guards the pass on the road from Ioánnina to Kalabaka, and Karpenísion, astride the road from Lamía to Agrínion.

Topographically then, the country provides almost optimum conditions for waging guerrilla warfare.

Strategic Requirements

Three basic strategic requirements must be met in the conduct of successful guerrilla warfare. The first basic requirement is to ensure the support—material, moral, ideological, and psychological—of a large part of the population of the area in which operations are to be carried out. Lacking this support by the population, guerrilla troops are faced with almost insurmountable difficulties in recruiting, intelligence and information collection, and supply. Without a doubt there is a decided advantage to the guerrilla force if this support by the population is voluntary and enthusiastic. However, this support can, if necessary, be induced by widespread measures of terror and repression.

Although the extent to which the Greek population supported the Communist guerrilla movement during 1946-49 cannot be validated, there was, at least initially, a great degree of sympathy for the Communist Party of Greece. This sympathy had been generated by the activities of the KKE's World War II military arm, ELAS (National People's Liberation Army), during the German occupation.

By the end of 1943 the ELAS forces had about 20,000 guerrillas and a highly organized underground which had been trained and in operation even during its period of suppression prior to World War II. The prewar organizations of the KKE were abundant and included not only hard-core Communists but sympathizers representing almost the entire spectrum of national life and culture. The Communist Party thus afforded the Greek people a multiplicity of organizations in which membership was possible for people in almost all age, sex, occupational, and social categories. The list of Party controlled organizations on page 19 shows the Communist facility for achieving unity among population elements of diverse personal interests.

Must Have Logistic Support

The second basic requirement for the successful employment of guerrilla forces

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is continuous logistical support from outside the area of operations. Since guerrilla forces do not maintain or operate the extensive industrial facilities required for the manufacture of arms, ammunition, technical equipment, and critical expendables such as demolitions and explosives, their ability to conduct offensive operations is dependent upon an uninterrupted supply of war matériel from allied sources.

This second strategic requirement initially was solved by the Greek guerrilla forces through the logistical support given them by the Communists and allowed to flow into Greece from her Communist neighbors—Albania, Yugoslavia, and Bulgaria. This logistical support included not only clothing, rations, arms, and ammunition, but training camps, transit areas, replacement centers, field hospitals, and supply depots, all easily accessible in safe areas across the northern borders.

The third basic requirement necessary in order to realize the objective of guerrilla warfare (to assist in the attainment of ultimate victory) is the close coordination of operations between guerrilla forces and conventional forces. The closer and more efficient this operational coordination, the greater will be the military advantages accruing to both forces. The Greek guerrilla forces fought as an independent military organization which could not consolidate its military gains because of the nature of the type of warfare in which it was engaged. Having failed to meet the third basic requirement, the guerrilla forces were forced to rely on attaining ultimate victory through political strategy. The objective was to demonstrate the Greek Government's inability to maintain law and order and to emphasize the deteriorating economic conditions stemming from the conflict, thereby forcing the government to sue for a cessation of hostilities on terms dictated by the guerrilla high command.

PARTY CONTROLLED ORGANIZATIONS

AKE—Communist Agricultural Party
DAS—Democratic People's Army (post-World War II guerrilla organization)
EAM—National Liberation Front (during German occupation)
ELAS—National People's Liberation Army (military arm of EAM)
EPON—Communist Youth Organization
ERGAS—Communist Labor Organization
ETA—Supply Organization of the DAS
KEN—Seamen's Partisan Committee
KKE—Communist Party of Greece
KOEN—Communist Organization of Aegean Macedonia
KOSSA—Communist Organization of the Army and Security Corps (secret cells inside the Greek National Army)
NOF—Slav-Macedonian Organization (promoting Macedonian independence)
OENO—Maritime Organization
OPLA—Protective Organization of the People's Fight
PDEG—Democratic Women's Organization of Greece

Prelude to Violence

Following the surrender of Italy in September 1943 many Italian occupation units in Greece, at the urging of British agents in contact with them, moved into the mountain areas supposedly to cooperate as Allies of the Greek resistance forces.

Instead, they were disarmed by ELAS forces. In this way the Communist guerrillas were able to build up sizable stocks of arms, ammunition, and equipment.

In October 1944 German forces withdrew from Greece and the Greek Government-in-Exile, composed of representatives from the major political parties, including KKE, returned from Cairo to Athens. General Sir Ronald MacKenzie Scobie, Commander of Allied Forces in Greece, which consisted mainly of British and a few Greek units, ordered the disbandment of all resistance groups. The ELAS forces refused to comply with this order and their political representatives resigned from the government on 2 December. The surface political unity was broken and on the following day an armed revolt by ELAS forces broke out in Athens. For two months civil war raged but the KKE was defeated in its attempt to seize control of the government. On 12 February 1945 the Communists and the newly formed government reached an agreement which ended the short but bloody uprising.

KKE leaders and commanders of the ELAS forces left Greece and took refuge in Albania, Yugoslavia, and Bulgaria. Other groups of ELASites took to the mountains and formed small bands which conducted sporadic harassing activities in the countryside. The reestablishment of the monarchy in 1946 was followed by an acceleration in Communist guerrilla activity aimed at disrupting the internal security and economic rehabilitation of Greece.

Followed Familiar Pattern

As in other European countries where the aftermath of World War II found the population destitute and ideologically confused, conditions in Greece offered a fertile area for the spread of communism. The three and one-half years of the German occupation of Greece were a record of despair—collaboration, inflation, hunger, oppression—and the political, economic, and social disintegration of a population subjected to the total impact of the "Übermensch" philosophy.

From its inception in 1942 the Communist guerrilla movement, organized and directed by hard-core Party members, attracted a motley collection of blind idealists, political opportunists, regenerate criminals, and misled individuals who honestly thought the KKE could alleviate the occupation and, later, the postwar misery of Greece.

During 1947 the guerrilla forces conducted small-scale operations, concentrating their efforts on an intensive recruiting campaign in the rural areas. The campaign was aimed at acquiring volunteers but also carried out a considerable number of forced abductions. By the end of the year Communist led guerrilla forces in Greece totaled approximately 23,000 armed troops, of whom 20 percent were women, with about 8,000 armed replacements in training centers in the neighboring Soviet satellites. "General" Markos Vafiades, who had been political commissar of the ELAS forces, was made commander in chief of the postwar guerrilla forces.

Government Measures Weak

During the early stages of the guerrilla rebellion, the countermeasures undertaken by the Greek Government and Greek National Army (GNA) failed to have any significant effect on reducing the offensive activities of the guerrilla forces. Basically, the reason for this failure was attributable to political interference in the deployment of the GNA. Influential politicians in Athens insisted on "adequate protection" for the areas which they represented. Under this pressure the GNA had dissipated its tactical capabilities by piecemeal deployment of most of its available units to the static defenses of towns and villages throughout the country. In addition, when

military commanders found it necessary to redeploy any of their units they had to seek authority through channels with final approval retained by the Greek General Staff.

In a politico-military situation of this type it was practically impossible for field commanders to adhere to the basic principles of war. The principles specifically violated were those of unity of command, mass, economy of force, maneuver, and, above all, the offensive. It was under these conditions which destroyed the GNA's initiative that the guerrilla forces, capably and fanatically led, were able to carry out their program of systematic devastation.

By the end of 1947 the guerrilla reign of terror had forced approximately 700,000 people of the farm population to flee to the larger cities for protection, further seriously complicating an already deteriorating political and military situation. The problem of providing shelter and food for these refugees was a tremendous economic burden on a nation which was already extremely short of dwellings and food supplies.

The Armed Conflict

During 1946 and 1947 the guerrilla bands scattered throughout Greece, each numbering 50-100 in strength, periodically descended from their mountain hideouts and carried out harassing raids against unprotected villages in order to collect food and clothing, recruit personnel, extort funds, sabotage lines of communications, and produce a general disruption of movement throughout the country. At this stage of the guerrilla campaign the Communist units were lightly equipped and seldom concentrated in large formations. They adhered largely to the three principles of successful guerrilla operations—surprise, shock action, and mobility.

Although the GNA had carried out a number of small-scale clearing operations during 1947, these only succeeded in pushing the guerrillas from one area into another, and in the north the guerrillas would simply escape into Communist satellite territory, subsequently reappearing in another part of Greece.

As is the case with any type of combat force, the guerrillas were faced with the problem of replacing losses in personnel, equipment, and supplies. Personnel losses were replaced through three principal sources:

1. The KKE supplied volunteers from among its members and sympathizers throughout Greece, especially from the larger cities where the underground's ability to operate is greatly enhanced.
2. Slav-Macedonian elements along the northern border areas, motivated by the hope of an autonomous Macedonia, supplied the recruits and formed a few small combat units of ethnic homogeneity.
3. Forced recruiting and abduction of villagers. Guerrilla raiders obtained the "cooperation" of the abductee by threat of death for him and his family should he attempt to escape or show lack of enthusiasm in combat.

Originally, the guerrillas obtained arms and ammunition from two sources: first, from Allied air drops made to the ELAS forces operating in the mountains of Greece during the German occupation, and second, from the disarmed Italian units following Italian surrender during World War II, and from German army supplies which the guerrillas were given in exchange for permitting an unhampered withdrawal of German forces from Greece in October 1944. The replacement of arms and ammunition during the postwar period of guerrilla operations was accomplished through logistical support by way of Albania, Yugoslavia, and Bulgaria.

Sound Intelligence Net

In the field of intelligence the guerrilla combat forces were aided by "self-defense" or informer personnel in most of the popu-

lated centers of Greece. These "self-defense" personnel operated clandestinely through local "YIAFKA's" * or cells, into an excellent intelligence net which kept the guerrilla forces informed of all GNA movements. In addition to their information function, YIAFKA members collected funds, carried out supply and recruiting activities, and were used to effect reprisals against individuals suspected of aiding the Greek Government forces in any way. At the end of 1947 "self-defense" personnel throughout Greece were estimated at about 50,000 with some 750,000 more sympathizers, some in high political positions, aiding the Communist cause in varying degrees.

Supply operations for support of guerrilla forces in the interior of Greece were difficult and hazardous because of terrain, distance, and possible interception by the GNA. The guerrillas solved the problem adequately by using pack animal trains moving mainly at night. Interior supply operations also were organized around guerrilla area units with an average strength of 56 to 60 men. The area units had the missions of collecting and forwarding information, concentrating and guarding food and ammunition caches, providing clothing, and arranging for the care of sick or wounded guerrillas. These area units were prohibited from leaving their area of responsibility and, consequently, during clearing operations by the GNA the units would split up into small groups and remain hidden in their areas until the situation permitted the resumption of activities.

At the beginning of 1948 there were 182,000 government troops in the field, supported by two *Spitfire* squadrons of the Greek Air Force, against 23,000 guerrillas without air support (see map on page 23). Terrain obstacles and the impossibility of sealing the northern borders of Greece were the principal reasons an armed force of this size had to be organized to conduct an antiguerrilla campaign.

To provide coordinated operational and logistical advice to the Greek Armed Forces, a Joint United States Military Advisory and Planning Group (JUSMAPG) under the United States Army Group was established in December 1947.

Guerrilla Tactics Sound

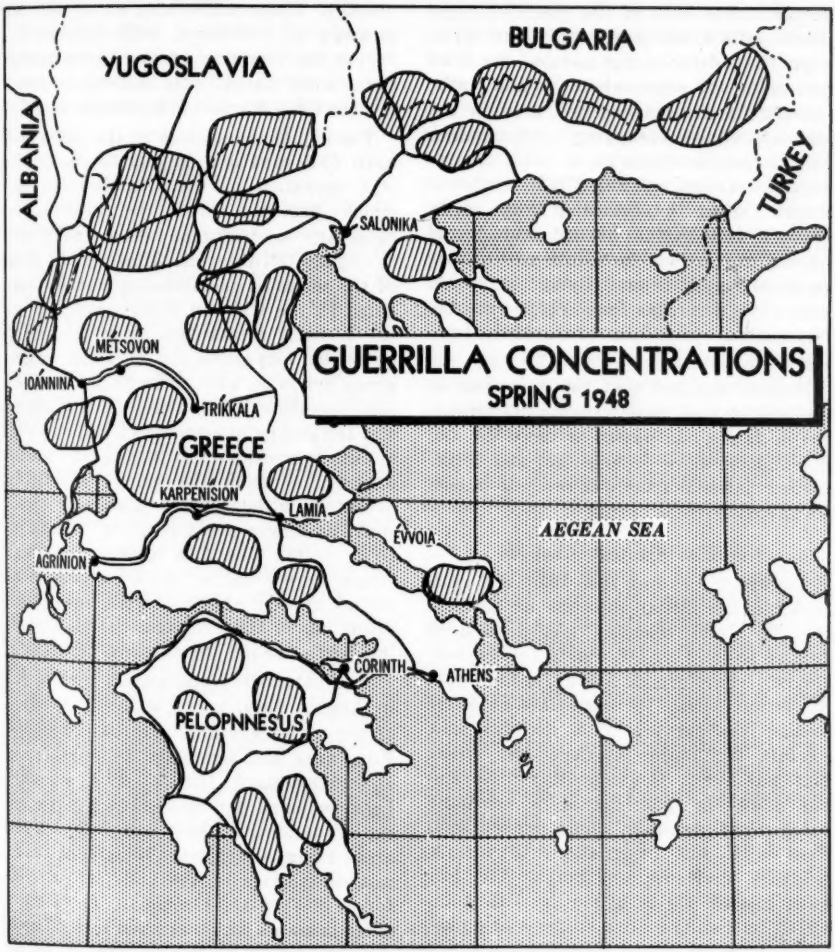
As a result of the combined efforts of the Greek General Staff and JUSMAPG, by the spring of 1948 the GNA was able to begin a series of planned major operations against guerrilla strongholds. In spite of well-conducted offensives which had cleaned out a number of guerrilla infested areas and reportedly cost the guerrillas 32,000 casualties in killed, captured, and surrendered, the total number of guerrillas in Greece at the end of the year remained about 23,000. Intensive forced recruiting inside Greece netted approximately 24,000 civilians. By virtue of this and the influx of reserves and recovered wounded from the border countries, the guerrilla high command managed to replace its losses during 1948.

The guerrillas had fought tenaciously and efficiently. Their tactics, ideally suited to the terrain, generally were of two types—the defense, for a limited time only, of an important area; and the hit-and-run raids of roving units.

In the limited time defense of an area, an outer ring (or outpost line of resistance) and an inner ring (or main line of resistance) were organized. These lines consisted of machinegun pillboxes dug into the ground and covered with 3 to 10 layers of logs with dirt filler in between. These pillboxes were mutually supporting, particularly at places where there were few, narrow avenues of approach to the defended position. In coordination with this area of defense, guerrilla saboteur squads operated in the rear of GNA

* From the Russian term ЯВКА, meaning place of meeting, usually of a conspiratorial nature.

lines mining roads and rail nets, destroying bridges and telephone communications, and ambushing supply columns. Guerrilla leaders placed great stress on the use of saboteurs and snipers for operations in areas under GNA control.



Raids Carefully Planned

In the hit-and-run raid the roving guerrilla forces of the interior assembled two or more units at some distance from the objective. The number of units depended on the scope of the operation to be carried out. By a forced march of up to 10 hours, and carefully avoiding observation, these units reached their objective and attacked, usually at night. Good intelligence had supplied the attackers with a plan of the town defenses, locations of the homes of

Nationalist sympathizers, important government and public service installations, military headquarters, factories, well-stocked shops, and a list of recruitable persons. The bulk of the guerrilla force would attack and enter the town while supporting detachments isolated the town by mining the approach roads and trails, blowing up bridges and rail lines in the vicinity, and occupying commanding heights outside the town in order to prevent the arrival of any GNA reinforcements. When the attacking force withdrew it left behind burned and gutted houses, government installations, utilities, factories, and shops. Lying murdered where the guerrillas found them were the Nationalist sympathizers and their families.

Despite the fact that the guerrillas at the end of 1948 still were 23,000 strong, the initiative had passed to the GNA and a confident, more experienced, and better trained national army was ready to launch its offensive in the spring of 1949.

Guerrilla Strategy Changed

Toward the end of 1948 the KKE realized that its initial objective of destroying the Greek economy was doomed to failure so long as US aid to Greece continued. Therefore, to attain its final goal of seizing power, its immediate objective became the delivery of a decisive blow against the major obstacle—the Greek National Army. Consequently, in November 1948 the guerrilla high command reorganized its units along conventional lines with unit designations to include brigades, divisions, and corps. The brigade totaled 600 to 800 men, with a division consisting of two or three brigades, and a corps of two or three divisions.

Shortly after this reorganization General Markos was relieved as supreme commander of the guerrilla forces. Based on what is known of the internal political struggle in the KKE at the time, it is probable that Markos' relief from command was due to his differences with Nikos Zachariades, secretary general of the KKE, who succeeded him as supreme commander. These differences concerned the strategy of resistance, with Markos favoring the retention of small unit operations, while Zachariades insisted on meeting the GNA forces in large-scale attacks.

The key to the success of the guerrillas until 1949 was due largely to the excellent operation of their intelligence net which provided them the information necessary to determine when and where to engage GNA forces. However, in each of the series of successful operations executed by the GNA in 1949, army and police security forces took steps to destroy or render inoperable the guerrilla intelligence net in an area prior to the start of any operation. This involved the arrest and temporary internment of known Communist sympathizers or suspected informers. As a result the armed guerrillas, operating without their "eyes and ears," could no longer avoid surprise attacks by GNA units. Guerrilla leaders and their forces were killed or captured in a number of quickly executed GNA operations beginning in the Peloponnesus and working north toward the satellite borders.

Two noteworthy operations, carried out in August 1949, involved the destruction of the major guerrilla strongholds in the Vitsi area and Grammos mountain area of northwestern Greece. The guerrilla high command had made the strategic error of deciding to hold and defend these areas along conventional lines. The result was destruction of the bulk of guerrilla forces in Vitsi and Grammos. Those guerrilla remnants which escaped into Albania could no longer be reconstituted as an effective fighting force. By the end of 1949 a few small, starving, and desperate guerrilla bands were left in the mountains, their entire effort directed toward survival. They were militarily incapable of

any significant activity. The KKE had failed in its objective of bringing a satellite Greece into the Soviet orbit. As an anticlimax the "Free Greek Government" announced that it had ceased to continue further operations in order to save Greece from destruction. This hypocritical explanation was motivated entirely by the desire to sugar-coat the very bitter pill of defeat.

Conclusion

International communism, operating in the Greek arena, used all of the typical stratagems of unconventional warfare in its drive for power—misleading Party names and alliances, "united front" association with worthy causes, organization of clandestine cells of hard-core members, infiltration and attempted subversion of the armed forces and government ministries, industrial violence and sabotage, espionage for foreign powers, and the stratagem of desperation: armed insurrection.

The failure of the KKE in its postwar bid for control of Greece was the cumulative effect of a number of factors, not the least of which were the Communists' fallacious evaluation of the psychological factors inherent in this type of warfare and their organizational and operational blunders such as reorganization into conventional, identifiable units which reduced mobility and tended to dictate conventional warfare. Other important factors, generally beyond the control of the KKE, were: Yugoslav denial (beginning in the spring of 1949) of supply routes into northern Greece; improved capabilities of the Greek Army as a result of US training and logistic support; and the gradual replacement of old and incompetent Greek division commanders by more capable officers.

The war in Greece was a civil war, for the most part conducted on the KKE side through guerrilla operations designed to harass, delay, and disrupt the military operations of the Greek Army. If such a people's war is to be successful, it must appeal to the fundamental political, moral, and ethical values of the people among whom it is waged. An intensive psychological warfare campaign must precede, and be conducted concurrently with, guerrilla warfare operations if the necessary support of a significant segment of the population is to be obtained. To maintain this support the tendency toward blind excesses of terror and destruction must be avoided at all costs, as this will finally lead to complete alienation of the populace.

Who can say what the course and duration of the war would have been had the Communists earned the voluntary support of a significant segment of the Greek people in the areas of their guerrilla operations? Instead, the KKE and its guerrilla forces resorted to indiscriminate rapine, extortions, assassinations, reprisals, abductions, arson, and terrorism which contributed a great deal toward sealing the military doom of the Communist guerrilla campaign in Greece.

MOVING?

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THE USES OF HISTORY

Doctor James A. Huston, Associate Professor of History, Purdue University

"HISTORY may be all right as an interesting pastime, but it has no place in any serious study of modern warfare; in fact, it is harmful, for it focuses attention on old ways of doing things when we should be searching for new and better methods. All too often we try to meet new emergencies by fighting the last war all over again." So might run the argument which one may hear with some frequency among officers being subjected to some study of military history.

But then a friend will answer, "Now wait a minute. If we studied history more, we could learn the lessons that are there and avoid making the same mistakes over and over again. We need to find and learn the specific lessons documented by history."

Actually *neither* of these views represents an adequate appreciation of the value of history. The first seems to suggest that new ideas develop in a vacuum. Without some reference to methods used in the past, how is anyone going to be able to judge whether any suggested new methods really are better? In a sense everything that we do, think, and plan is the result of past experience, conditioning, and events. How can we ignore the past with profit when all that we do, in a certain sense, is based on the past?

On the other hand, it is also a mistake to look at history simply as a compilation of specific lessons to be learned and applied. In a broad and general sense it may be said that history does hold valuable lessons for us, but there is far more to it than that. Indeed, attempts to confine ourselves too strictly to "lessons learned" may lead to unfortunate consequences and to a failure to gain the broader advantages of historical study. One of the very few absolutes in history is this: *All conditions of a given situation never are reproduced.* Whenever some elements of a situation are changed, then no specific lesson can apply exactly. To make the necessary corrections in applying any historical lesson requires judgment and understanding.

What, then, are the broader advantages of historical study?

First of all there is that common generality that history has cultural values. And so it has. Man is endowed with intellectual curiosity. Too frequently this seems to be dulled by too strenuous or cumbersome efforts at teaching, but man generally is fascinated by the world about him and by the story of his own development. History can add a great deal to the zest of living not only by satisfying some of this intellectual curiosity, but also by providing common interests with other people. Probably no subject can give to a person more "things in common" with other people generally than can history. This affords common ground for understanding people, for conversing with people—for living with people.

Perspective Evaluates Events

But beyond all this are other more or less obvious values of history. These in-

Everything that we do, think, and plan is the result of past experience, conditioning, and events. There is no better method for extending experience vicariously than by the serious study of military history

clude perspective, inspiration, and experience.

Perspective gives a sense of proportion in relation to time, place, and circumstances. It persuades a person to look at the long view over short-term advantages and disadvantages, and in war to recognize that the ultimate objective must prevail over intermediate objectives. Perspective temporizes excessive optimism and pessimism by developing an awareness of continuous change. And it helps develop a sense of values for the critical appraisal of achievements, methods, and decisions.

Was American logistical support in the war with Mexico good? Compared with what might have been done, many deficiencies were apparent. Taylor gave little attention to his requirements and to making requisitions in time to be filled. Scott tended to overstate his requirements. Both complained that they were paralyzed at times by a lack of adequate transportation.

Yet compared with anything that the United States had done before, and compared to what the enemy was able to do, American logistical achievements in that war were remarkable. With complete success the Army introduced the use of steamboats on a line of communications on the Rio Grande, it supported its first oversea expedition, and it conducted a series of the longest marches in its history. While Taylor and Scott chafed at their lack of transportation, the Mexicans marveled at the way they were able to move their armies from one part of the country to another.

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Inspiration From Examples

Another important value of history is inspiration. Unquestionably, the obstacles and hardships of warfare are magnified by mental responses. But if men know that other men have overcome similar or worse conditions, they may be persuaded that they can do as well. If they see the issues involved, they may be inspired by earlier examples to perform greater feats than they thought possible. But the history must be true. If Washington, for example, is built up as a demigod, then his perseverance in the face of adversity, his triumph against great odds, give little encouragement to the ordinary mortal. But the fact that Washington was a man, although a great one, with ordinary men in his command, makes his achievements all the greater, but also within the grasp of other men.

Probably a more direct inspirational value of military history is in the building of *esprit de corps*. Some of the old regiments long have given this serious attention, and in recent years a great deal more has been done in the way of developing the inspirational value of unit history, and of the history of the Army as a whole. Again, if history is to have its greatest value, it must be accurate, and it must be as complete as possible. Overemphasis of a unit's accomplishments, and glossing over any outstanding failures not only is a misuse of history, it endangers the whole value.

For lasting worth, history must be more than propaganda. Sooner or later the distortions and the omissions will appear. This can lead only to disillusion and to loss of respect for the unit, and of confidence in its leaders. Frank admission of shortcomings will gain confidence in the accomplishments which are the basis for unit pride.

Experience Through Study

Finally, the study of history develops a great reservoir of experience. Few ques-

tion the value of an experienced officer in any position. Provided his imagination remains keen, and his mind flexible, any veteran of the last war generally would be preferred over a completely inexperienced officer with the same abilities for any key assignment in the next war. Who would turn down a high-ranking, but youthful officer who had had experience in all our wars, if that were possible? Yet few appreciate the value of history as an extension of general experience. Through the study of history it is possible for an officer to gain at least a part of the experience of an officer in the Civil War, in World War I, in World War II, and Korea.

Experience is the raw material of imagination, and history is the great source of experience. Far from discouraging new methods and new ideas, history is the very basis for them. *There is no such thing as abstract imagination. Imagination is a reorganization of elements out of past experience.* With no experience at all there could be no imagination at all. The value of the "lessons of history" is in providing those elements out of experience. They should be used then as elements of imagination for meeting new situations, not as patent solutions for situations which cannot fit exactly. In fact, the attempt to deduct only the "practical lessons" of history can result only in the loss of a great deal of valuable experience. *Efforts to apply the "lessons" too strictly or too literally not only may lead to grief and disillusion in the particular situation, but this also nullifies the greater value of those lessons as elements of imagination.*

Wisdom From Experience

Experience also is the raw material of wisdom—the capacity to make right decisions. Experience alone does not create wisdom, neither does imagination. Intelligence and ingenuity have to develop it. But experience is the raw material, and history is the great source of experience. When one speaks of a very wise man, he usually thinks of an old man. Why? It is not because age brings wisdom, but because the older man is likely to have had more experience. Through the vicarious experience of history, the young man too may develop wisdom.

Still, one might ask such a question as: What possible value could there be in a study of the logistics of the Revolutionary War? Can it be of any possible use to a modern G4 to know how many wagons it took to carry supplies for 1,000 men through the forest? No, perhaps not. But it might be of some value to him to know why pack animals were used in a certain area rather than vehicles, or to know something about Burgoyne's attempt to use *corvées*, or carrying companies of Canadians, to carry supplies for his troops in the Saratoga campaign, or it might help to know how the French provided matériel assistance. A study of all these might provide elements of imagination for a modern G4 which he might use in developing ideas for carrying companies or pack animals in Korea.

A student's ideas on foreign military assistance might be affected by an understanding of the French policy of treating the revolting American colonies as equals with no teams to screen requirements, supervise distribution, or observe operations, and by an appreciation of how this policy helped build a reservoir of good will for France in the United States which has lasted nearly 180 years. Or an understanding of the role of the Continental Congress in military affairs—seeing that its shortcomings were *not* the result simply of stupidity, shortsightedness, greed, selfishness, and envy, but also of sincere differences in interests and views, a concern for long-range consequences, and the political conditions of the times—might affect current ideas on relations with Congress and military legislation.

Elements of experience out of history frequently can be introduced as illustrative examples in the various courses for

the instruction of commanders and staff officers. Here no attempt should be made to make the example too much of a specific lesson, nor should it be resorted to in order to "prove" a theory or a principle. *Whenever someone makes a statement that "all history shows. . . ." or "never in the history of warfare. . . .", it ought to be an open invitation to search for exceptions to the statement being offered.* Advocates of every cause turn to history for justification. False prophets can succeed only when their audiences are not well-rounded in their historical studies.

As a Teaching Method

Historical examples may be excellent, however, as illustrations of points and even as a basis for instruction. They add more interest and realism to studies than all the words of warning and admonition that can be pronounced. How much more interesting it is to make a detailed historical study of a problem than to persist always in fighting a fictionalized "Aggressor" through Town X and Town Y. What can give a more dramatic portrayal of the problems of G2 than the detailed study of the intelligence activities and reports of the units opposed to the Germans' Ardennes offensive in December 1944?

The same approach could be used for many other types of problems. What could be a better background for an entire course for staff officers at army level, for example, than a detailed study of the Third Army in Lorraine in 1944?[1] The history published by the Office of the Chief of Military History could serve as a basic reference book. Extracts could be duplicated for the use of students in determining the situations. The maps, overlays, intelligence estimates, operation reports, and journals that the Third Army actually used could be duplicated. Then at each step the actual problems which faced that army could be analyzed, and solutions could be compared with actual decisions. This could include tactical, administrative, intelligence, and logistical problems in all the various situations.

The student, orienting himself into an actual historical situation, and working with it day after day, would become completely familiar with it, and then he could devote his attention to the related tactical or logistical problem without the distraction of having to rethink the general situation every time a new problem arises.

After analyzing the historical problem in each case, the students could proceed to analyze what different solutions would be possible with the newer weapons and organization of the Army. The same could be done for Okinawa, or St. Lo, or the Ardennes, or Korea, at whatever level desired, for instruction in whatever subjects desired. This would be a use of historical examples as a method of instruction, not as specific lessons. The purpose would be to illustrate general principles, and at the same time to add to the storehouse of experience of every officer concerned.

Use History Honestly

Innumerable historical examples can be found to illustrate every one of the principles of war, and they will mean much more than a bland statement of an axiom. But here a special word of caution is in order. To illustrate a particular principle of war, instructors frequently cast about for a great victory which fits well and then offer this as proof of the principle. Then to establish the principle even more firmly, they cite "horrible examples" of cases where the commander violated the principle and suffered defeat. Sometimes it is not at all clear that a defeat really was the result of such a violation.

There may have been other factors far

[1] At the U. S. Army Command and General Staff College this type of instruction, known as the "case method," has been and is used to present a variety of subjects. As discussed by the author, the German buildup for the December 1944 Ardennes offensive is the basis for a study of intelligence procedures and the Lorraine Campaign of the 12th United States Army Corps in 1944 is the vehicle for a study of corps operations.

more important. If so, it is a serious misuse of history to isolate one supposed factor for the purpose of establishing a principle. It is also a misuse of history to ignore the outstanding exceptions to the rule—and outstanding historical exceptions are to be found for nearly all the principles of war. *Indeed the exceptions may be most important of all, for it is only by recognizing the frequent exceptions that the officer can retain his flexibility of mind.* Otherwise he may lose big opportunities by too rigid adherence to fixed principles, and he may become the victim of frustration and indecision when he finds some of the principles in conflict in some situation. Historical study soon will persuade an officer that the principles of war should be regarded as nothing more than guidelines for the imagination.

In any military organization nothing can be more valuable than good ideas and right decisions. No officer should be more sought after as a military asset than the imaginative and the wise officer. Both imagination and wisdom are the products of experience—with the benefit of intelligence and ingenuity. And there is no better way for extending experience vicariously than by the study of history.

It may appear that the military services often seem to stress the scientific and technological aspects of national defense. It is true that the scientists and the technically trained graduates of our advanced schools have come to play a tremendously important part in developing the weapon systems which are so necessary if we are to maintain our superiority in this vital field in relation to our possible adversaries. However, this concern for technology in nowise derogates from our recognition of the need for men reared in the liberal arts and social sciences to provide the wise leadership which must guide the use of the dreadful weapons which we now possess.

Certainly, most of our troubles today relate to our difficulty in utilizing wisely the products of our technological advances. We seem to understand atoms in the society of the molecule much better than people in our own society. The weaknesses of our deterrent posture lie more in the fields of ideology and politics than in matters of strictly military nature. There is an ever-present need for broad guidance of our integrated national strategy directed by men who are capable of understanding people, hostile and friendly alike.

To discharge our responsibilities of world leadership, we would do well to learn all that we can about the Communist world. We Americans often decline to read about, to study, or to take countenance of problems which are distasteful to us. We sometimes seem to feel that we can hurt our enemy by refusing to recognize his existence. I hope that we are learning more mature ways and recognize that if he is to be circumvented, the enemy must be closely studied—his history, customs, language, dogma, and mode of thought.

General Maxwell D. Taylor

John Bloch--A Neglected Prophet

(Mr. Adolph G. Rosengarten's article on John Bloch which appeared in the Apr 1957 issue of the MILITARY REVIEW *prompted Captain B. H. Liddell Hart to forward a copy of a letter which he wrote to Field Marshal Earl Wavell several years ago. It is published here as the opinion of one of today's leading military analysts.—Editor.)*

Wolverton: 3122

Wolverton Park,
Buckinghamshire.
23rd December, 1948.

My dear Wavell,

I read your letter of the 14th with much interest, and should have answered it before—but for the necessity of refreshing my memory and "verifying my references."

I have Bloch's six huge volumes in my library, and also the condensed English translation of them—published in 1900. I think it's a pity that you only found time for a hurried glance at the former, and did not see the latter—which does not take so long to read. For it is evident that you were misled by Maurice (whose book is rather a shallow production). It is obvious that he was merely trying to pick holes in Bloch—which is easy if one is dealing with any large work of a prophetic nature, and trying to make a case against it, instead of arriving at a just estimate.

In studying any writings of the past, one needs an historical sense—to understand the conditions prevailing at the time he wrote. If one examines Bloch's writings with that historical sense, and with an unprejudiced mind, his errors are far less remarkable than the extent to which he correctly predicted the conditions that would develop, increasingly, in the next three wars, the Boer War, the Russo-Japanese War, and the First World War. He was somewhere near 80% right on the main factors—whereas the contemporary official manuals were far more wrong than right.

Among the predictions were—

1. That battles would open from much greater distances than formerly.
2. The necessity of loose formation in attack.
3. The strengthening of defence.
4. The hopelessness of frontal attacks, except with a great superiority of force.
5. The increase in the area of the battlefield.
6. The increase of casualties.
7. The paralysis of cavalry action.
8. The growing power of artillery.
9. The general development of entrenchments.
10. The greater ease of withdrawal by the weaker side.
11. The increasing difficulty of effective pursuit.
12. The indecisiveness of future battles.
13. The lengthening duration of wars.
14. The increased importance of Intelligence.
15. The tendency for directing power to pass from the hands of the higher commanders into the hands of battalion and company commanders.
16. The rising ratio of officer casualties, and the effects that would have.
17. The increasing dependence of armies on their supply lines.
18. That "in addition to military skill, it will be necessary that a Commander-in-Chief shall be a good administrator."

The only big mistake that Bloch seems to have made was in underestimating the unwillingness of the European nations to commit mutual suicide. But he did predict that they would carry on the effort long enough to produce an internal upheaval and social revolution in their own countries. As he was writing from the Russian standpoint, the truth of his prophecy, and its far-reaching consequences, is all the more evident.

I agree with you that there is not really a satisfactory Life of Wellington, but am rather surprised that you should still think that Guedalla's is on the whole the best. For "best" surely implies something more than good—and is it right to consider anything historically good that is crammed with errors and omissons, even if it does produce quite a life-like impression of the man?

With all good wishes for Christmas and the New Year.

Yours ever,
B. H. LIDDELL HART

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CHERCHEZ LA GIMMICK

Colonel George B. Pickett, Jr., *Armor*
Faculty, Armed Forces Staff College

RAIDING behind the Union lines in Tennessee in October 1864, the great Confederate Cavalry leader, General Nathan B. Forrest, encountered four Union blockhouses across his path between Spring Hill and Columbia. He summoned the Union commander to surrender but his demand was refused. Then he requested an interview with the Union commander —a request which was granted. The Union officer gloated secretly when he saw that the Confederates were without any artillery support. Forrest, however, ensured the Yankee he had a secret weapon which could destroy the Union blockhouses and kill all the defenders. Professing a noble desire to save needless bloodshed, Forrest demonstrated his secret weapon to the Union officer. Taking a bottle of some mysterious liquid, he broke it open and poured it over the stump of a tree. The liquid flamed up immediately and flowed over the stump.

The Union officer was hurried away from the "danger area" and promptly surrendered before he could see the real effect of Forrest's secret weapon. This particular Union commander had been the victim of a gimmick consisting of nothing more deadly than a simple trick of chemistry, but his credulity opened the way for the Confederates.

Small-Scale Strategy

A gimmick can be defined as any small device used secretly by a magician in performing a trick. In its broader connotation the word can mean any stunt by which a writer or speaker puts his idea across or sells his point. Hannibal, during the Punic Wars, was accused by the Romans of using "tricks" or stratagems to win his battles—giving us our word "strategy." Yet gradually strategy has come to mean principles—roots, fundamentals—almost to the exclusion of its origin, which was the idea of the trick or gimmick used to unbalance the enemy.

Historical Examples

The gimmick is a key to successful grand strategy, strategy, and tactics. The concept is illustrated by the actions of the Spartan Admiral, Lysander, in the Aegean in 405 B.C. Athens and Sparta still were wasting men and brains in the bloody and indecisive Greek wars.

The lifeline of Athens was her merchant fleet which delivered grain from the Pontic regions. Athens depended upon food from that area delivered by merchant ships. Her fleet naturally was forced to protect this national lifeline. Lysander in an effort to seize the initiative, brought the Spartan fleet into the Aegean to threaten these Pontic grain shipments, forcing the Athenian fleet to oppose him opposite Aegospotami. For four days he avoided battle. On the fifth day, Conon, the Athenian Admiral, sent the bulk of his crews ashore for food and other supplies.

Lysander, who had held his crews aboard ship and out of the protected harbor

Throughout the history of war successful commanders, faced with tactical or strategic problems, have turned the tide of battle by properly applying their imaginations and conceiving gimmicks to ensure victory

of Sestos, attacked and destroyed the virtually unmanned Athenian fleet almost without opposition. Conon, however, managed to save nine of his Athenian ships and escape by landing at Abarnis, seizing, and sailing off with the sails of the Spartan fleet. In those days a fleet stripped its sails prior to a big sea battle and stored them on shore during the fight. This gimmick immobilized the Spartan fleet, even in victory, and enabled Conon to escape. He, too, conceived a gimmick, but a little too late. These are the gimmicks, at each level, which secured victory for Lysander:

Level	*Gimmick*	*Result*
Grand Strategy:	Cutting Athenian "lifeline" by intercepting Pontic grain shipments.	Seized initiative from Athenians by forcing them to take direct action to rectify the situation.
Strategy:	Awaiting for Athenians to go ashore to resupply but not depleting his own crews by doing the same; then attacking the almost unmanned Athenian fleet.	Outcome of the battle was ensured for Lysander.
Tactics:	History does not record the gimmicks employed by the various segments of the fleet or of the individual ship captains.	

This concept of utilizing gimmicks to gain the advantage at every level has not been understood—or at least not used—by some of the great captains. No one understood better than Napoleon the strategic concept of unbalancing an enemy by using the gimmick of cutting the enemy's lifelines and forcing him to fight at a disadvantage. Yet Napoleon rarely employed a gimmick to gain a tactical battle. He relied on the old idea of concentration of superior force, an effective but far more costly method. The one notable exception was the youthful Napoleon's gimmick of sending a group of trumpeters in rear of the enemy at Arcole and having them sound "the charge." This gimmick saved him from a near tactical defeat; but his use of gimmicks at the tactical level was rare.

Parade of the Few

Although Hannibal can be considered the father of the gimmick in war, numerous other successful commanders have used it. They are the ones we remember and study today. Stonewall Jackson's Valley Campaign in 1862 was a strategic success because it tricked Lincoln into immobilizing troops intended for McClellan in the peninsula. The gimmick used by Lee and Jackson was to capitalize on Lincoln's fear of the Confederates capturing the Union Capitol of Washington, D.C.

Old Bedford Forrest was another past master of the gimmick concept. One of his favorite gimmicks was to secure an interview with the opposing Union commander and then put on a drama for his worthy opponent—a drama consisting of hopelessly outnumbered and outgunned Confederates moving by in a continuous column of men and guns, giving the impression of overwhelming strength. Many a Union commander, including Colonel Streight—of Streight's Raid to Rome, Georgia, fame—swore in disgust when, after his arms were stacked in surrender, he learned that Forrest had paraded the same men and guns by him over and over again and fooled him completely.

Korean Gimmick

Has the gimmick concept worked in modern war? Definitely, and as late as Korea.

The military reputation of General Douglas MacArthur reveals a master talent for use of the gimmick. Recall the grim bitter days of late August and early September 1950 on the Pusan Perimeter. Picture the commander of the United States Eighth Army with his lines riddled, his reserves expended except for one small understrength battalion, and no replacements in sight. Suddenly he hears that the divisions being assembled in Japan are not going to be used to reinforce his crumbling front, but are to make an amphibious assault at distant Inchon. Not only that, he is told also to launch a counteroffensive on 15 September 1950 in coordination with the Inchon landings.

Few United Nations officers then in the front lines on the Pusan Perimeter would have risked a 10-cent bet on the success of Eighth Army's offensive. Yet within two weeks Eighth Army had broken out and swept north to the 38th Parallel. The gimmick?—General MacArthur's decision for "all or nothing" at Inchon. The Inchon landing was such a bold venture that it completely unbalanced the entire North Korean defense structure. It is an outstanding example of both the gimmick concept and Liddell Hart's theory of the indirect approach.

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Chinese Gimmick

The gimmick was not used solely by the United Nations Command in Korea. It was used effectively by the Chinese in their November offensive in 1950. Their gimmick was to confuse the UN Command as to whether they would intervene, allowing the UN forces to overextend themselves up the narrow finger type valleys leading to the Yalu River. This was the Chinese Communist Forces' grand strategic and strategic gimmick.

At the tactical level the CCF used the extreme cold, bad weather, and difficult United Nations Command communications to strike and destroy a Republic of Korea corps, and then to infiltrate deep into the rear of the Eighth Army's right (east) flank and set up the well-known "gauntlet" between Sunchon and Kunu-ri. Their tactical gimmicks also included night operations, infiltration, and surprise. The results were obvious. The UN forces were forced to withdraw hurriedly behind the 38th Parallel, losing heavily in men and equipment.

That CCF offensive was loaded with gimmicks. Gradually, however, each subsequent Communist offensive lacked the punch of the initial drive, primarily because the Chinese used old gimmicks which the UN forces had learned to expect and counter. Their actions finally became so obvious that the IX Corps G2 predicted the strength, location of main effort, and day of attack of the CCF April Offensive in 1951. The resulting slaughter of the enemy at Kapyong by the British Commonwealth Brigade and Company A, 72d Tank Battalion, rewarded the Chinese amply for their failure to use a satisfactory gimmick. The enemy is not stupid. What fools him today may not fool him tomorrow, as the CCF learned at Kapyong.

New Weapons and Machines

The gimmick concept is not limited to command "tricks" and psychological maneuvers by commanders. A new weapon or

new fighting machine itself can be the gimmick to ensure success. The development of the tank is a perfect example.

In World War I, British Lieutenant Colonel (later General) E. D. Swinton determined to develop something to break the deadlock of trench warfare and stop the futility of attempting by artillery and infantry masses to achieve a successful breakthrough on the 1914-15 battlefield dominated by the machinegun. His idea was an armored vehicle on caterpillar tracks. Winston Churchill, then First Lord of the Admiralty, backed him. Strangely, the British Army was slow to accept the idea. On 15 September 1916 the tank appeared and completely demoralized the enemy. That it was not properly used until the German development of the Panzer Division for World War II is no fault of Swinton's. He produced the gimmick to do the job, but commanders of that day did not exploit it to full advantage.

New tactical doctrine and new combat techniques are excellent fields for the development of gimmicks. Von Hutier developed his "soft spot infiltration" tactics before Riga in 1917 and Ludendorff achieved the hoped-for breakthrough against the Western Front Allies in March 1918 using Von Hutier's technique. It was a real gimmick, so far as the unbalanced and disconcerted Allies were concerned; but Ludendorff could not exploit the success and his breakthrough led only to final defeat in a war of attrition. There is no limitation to the field or area of the gimmick. Tactics, strategy, new weapons, techniques, added *esprit*, and will to fight are all fertile fields for the development and exploitation of gimmicks.

The French Police have an expression that in a murder investigation always "Cherchez La Femme"—Look for the Woman. In the study of military history, strategy, and tactics let us learn to "Cherchez La Gimmick." When we are faced with a tactical or strategic problem, let us put our creative imaginations to work to conceive a gimmick that will ensure our success.

I visualize that the atomic battlefield of the future will have much greater breadth and depth than battlefields of the past. There will probably be a checkerboard disposition of units with considerable gaps between combat elements. Consequently, all Army units must be trained for all-around combat in the same way that we trained and fought our airborne divisions in World War II.

The problem of the ground commander will be to find the enemy, to determine his configuration, and then to destroy him by directing atomic fire upon him, using his own organic weapons or calling down the fire of distant missiles deployed to the rear. Thereafter the commander will need instant mobility to exploit the effects of this destructive fire.

General Maxwell D. Taylor

Combat Engineers of Tomorrow

Major Charles L. Steel, Jr., *Corps of Engineers*
Student, U. S. Army Command and General Staff College

DOES the battlefield of tomorrow require the combat engineer who in yesterday's war played such a vital role in the success of combat forces?

Military strategists of today look into the future and see a vastly changed battlefield in tomorrow's war. The closely spaced foxholes with crudely installed barbed wire entanglements have disappeared, and no longer are roads and trails lined with tired and weary soldiers advancing toward an unseen enemy. What has replaced these scenes of yesterday's battlefields?

In an extreme visualization, tomorrow's battlefield is much larger in size, both in width and depth, in order to provide room for dispersion and diminution of the awesome effects of atomic artillery and guided missiles. Trucks, tanks, DUKW's, and other combat vehicles have been replaced by odd conveyances that can fly, swim, and walk. These new conveyances, perhaps powered by harnessed atomic energy, are constructed of a new metallic alloy or plastic, stronger than steel yet lighter than aluminum, and capable of withstanding the blast and thermal effects of atomic explosions as well as the effects of deadly but unseen gamma rays that will blanket the battlefield.

If all of these "miracles" of scientific and industrial development can be realized, and do materialize in tomorrow's war, the role of the combat engineer will change. But his role will be just as vital as it was yesterday, if not more so.

As tomorrow's battlefield comes more sharply into focus, it is evident that engineer type tasks are being performed throughout the battle zone. These tasks appear to be grouped into two major categories—*close support* and *general support.*

"Friendly" Mines

The close support tasks bear a great resemblance to tasks of yesterday, but it is difficult to distinguish the engineer soldiers from the infantrymen, the artillery gunners, and the tankers. In fact, all of these soldiers appear to be improving their own battle positions with strange new mines. These automatic mines will detonate when enemy forces assault friendly positions, yet are harmless when friendly troops counterattack through them or they are picked up for reuse. It appears it is not necessary for an enemy soldier to step on these mines to detonate them. Instead, in the manner of the proximity artillery fuze of yesterday, they explode when the enemy comes within lethal range.

In this picture of a future battlefield, why are so many holes being dug? Is not this the day of mobile warfare? Closer study of these holes discloses several purposes: holes in which to locate static and semistatic installations for protection from atomic effects; holes in which to store critical supplies throughout the many dispersed supply points and depots; and holes in which to bury atomic mines that will block entire valleys if exploded.

Many of the tasks being performed are

Tools may change, modes of travel may vary, and the atom may be harnessed, but combat engineers will be needed to provide ground mobility for friendly forces and to impede, divert, and retard enemy land forces

familiar. These include water supply, camouflage, and removal of enemy created obstacles, as well as repair and maintenance of roads and bridges. In this future war will there be a need for bridges and roads? If the classic mission of seeking out and destroying the enemy is to be performed, it will be most positively accomplished through the engagement of land forces. Those forces with the greatest ground mobility will have a tremendous advantage. And air mobility is not to be overlooked. Other engineers are clearing landing pads for helicopters and other vertical takeoff and landing (VTOL) craft, as well as preparing small ships for use by rugged, forward support short takeoff and landing (STOL) or pantobase aircraft.

Recalling and restating the mission to seek out and destroy the enemy is also helpful in understanding future engineer tasks of a general support nature. Extensive minefields are being installed to canalize enemy forces or to divert them into "killing areas" where they must concentrate and thereby present remunerative atomic targets. One can see that this aspect of using high-density minefields is only one of the many functions of mines under the new concept of mass mine warfare. Some of the other functions are to:

1. Provide buffer zones between opposing forces to permit use of atomic missiles closer to enemy frontlines without exposing friendly forces to the lethal effects of atomic explosions.

2. Permit economy of force through the light manning of quiet areas so that friendly forces can concentrate at critical areas.

3. Act as a "static barrage" to kill enemy soldiers and to disable enemy vehicles when they come within range.

Many engineers are seen performing strange tasks in the forward zone in those areas between the major elements of the combat forces. These engineers appear to be formed into barrier battalions and their missions seem to include installation of barriers which stretch between the actively engaged friendly forces and surveillance of these barriers both in the air and on the ground. In a few areas engineers actually are defending these barriers while friendly mobile ground forces are being flown in to take over.

Commanders Utilize TV

Also visible on the future battlefield are soldiers peering into television sets. Can they also be engineers? What is coming in on the video screen? The soldiers seem to be examining the terrain for matters of engineer intelligence—rivers, roads, soil trafficability, condition of bridges, presence of natural and artifical obstacles, and sources for engineer materials such as timber, stone, sand, steel, and other items needed in construction. Another screen seems to be used only for battlefield surveillance, scanning minefields and obstacles installed as part of the barrier system. Many unfamiliar devices are in use, some apparently using infrared rays for their operation. Yes, whether in engineer intelligence or in barrier surveillance, they are all engineers. Their mission has expanded greatly to keep abreast of technological advances.

Still another major task being performed by engineers is the construction of large decoy installations. Of the many types of

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decoys in various stages of completion, one of the most unique is one representing an entire battalion of guided missile artillery —a representation faithful to both the human eye and the television camera. These decoys are a far cry from yesterday's attempts to imitate individual tanks, aircraft, and vehicles.

Another large group of engineers is working in an area from which friendly forces are withdrawing. These engineers are preparing critical strategic facilities for demolition. Both conventional explosives and atomic means are being used. Some of the targets appear to be industrial facilities such as portable atomic powerplant factories, while others are concentrations of potential war materials. Demolition of these targets amounts to a strategic denial operation.

There are other engineer tasks being performed but the fog of the battlefield prohibits recognition. However, this brief glance at the battlefield of tomorrow clearly has portrayed the requirement for combat engineers on every battlefield to furnish engineer support to the combat forces. As the years go by the tools may change, modes of travel may vary, even the atom may be harnessed for countless purposes, but combat engineers always will be needed to provide ground mobility for friendly forces, and to impede, divert, and retard enemy land forces.

It is logical to assume that engineer tasks will continue to be grouped into *close support* and *general support* categories. The close support tasks of the future will resemble similar tasks of yesterday, but will be accomplished with futuristic tools. All soldiers will be taught to perform some of these tasks, while the engineers' job will include teaching and supervising as well as performing more specialized missions. The task of the engineers to employ mass mine warfare properly and effectively appears to be one of the most essential keys to future victory.

General support tasks of the future will require more skill and more effort, and will embrace many new fields of endeavor. However, the combat engineers, striving to live up to their motto *Essayons*, will continue to play a vital role in support of combat forces along the road to ultimate victory —victory which can be accomplished only by seeking out and destroying the enemy combat forces.

There is no doubt that in World War II and in Korea the engineer soldier proved his outstanding capability, both on the fighting front and in logistic support of the line. On the front he elevated the common bulldozer to the stature of a weapon. On the communication line his construction ability helped to make possible logistic feats that baffled the enemy and amazed our allies. He was an accepted member of the combat team, fighting side by side with the doughboy, the tank driver, and the artilleryman.

Today, the engineer soldier is prepared to carry on in this tradition. His training is excellent and his equipment is keeping pace with the latest industrial and technological developments. He is capable of accomplishing far more than ever before.

Major General Emerson C. Itschner

WANTED: *Professionals for Rescue and Rehabilitation*

Major Irvin M. Kent, *JAGC*
Headquarters First Army

THE current concept of civil defense, which appears to be based upon the premise that initial relief effort for an area stricken by atomic or thermonuclear attack will come from within the target area itself, seems like asking a man who has just suffered a ruptured appendix and two compound fractures to give himself first aid.

True, civil defense organizations exist outside the major target areas, but their people are not trained or equipped (nor can they be on the basis of the present type of voluntary organization) to provide adequate disaster relief within major target areas as much as several miles from their homes. Naturally, they can and will help care for the refugees and the evacuated casualties. But who is going into the target area immediately after the attack and take care of the stricken, bury the dead, feed the hungry, reestablish law and order, restart essential services from wrecked plants, and generally provide not only relief, but the actions necessary to the continuation of the war effort so that the Nation can keep fighting back?

This is not to say there is no valid reason for continuing civil defense activities within target areas at this time. Recruitment and training of volunteers should continue to the maximum extent possible. Some civil defense personnel may survive and those who do will be invaluable to any aid group sent in. Certainly, civil defense organization on the periphery of the target areas must continue in force and must be strengthened. The services of these civil defense personnel will be priceless in fighting panic and aiding in the multitude of tasks in their own communities. But can they be expected to achieve such a state of training that they would be really useful for actual rescue and rehabilitation work in the target area itself? Probably not, at least not on an effective scale—and in any event they probably will be needed at home.

Must Know Area

One reason the civil defense volunteers on the periphery and beyond cannot be used to the maximum advantage within the target area is lack of familiarity with its topography and key installations. Individuals ordered into the chaos of a disaster area should be fully familiar with every important feature of the target area—its road network, bridges, utility systems, public buildings, essential factories, transportation facilities, and other installations, ad infinitum. It is too much to expect that volunteer workers in communities hundreds of miles away can spend enough time in the potential target area to learn all of these matters so well that they could enter a completely smashed area, by day or night, and start the sal-

If an atomic missile strikes an industrial center, immediate relief and rehabilitation requirements will be beyond civil defense. Security of the war effort recommends organization of a special Army Command

vage and rescue effort, let alone begin emergency reconstruction.

The emergency reconstruction factor alone—reconstruction of those facilities absolutely essential to the continuation of the war effort—poses a job beyond that which can be expected of workers who can devote only part of their time to the assignment. The civil defense organization cannot establish a full-time staff on the scale necessary to do the job, and an attempt to do so would, to a large extent, duplicate military organization and compete with the military services for high grade manpower. Current civil defense planning, at least to the extent so far made public, has not yet gone deeply enough into this subject, largely because, one is led to suspect, the job is so far beyond the capacity of its limited organization.

Even such a basic requirement as the restoration of law and order, essential to relief as well as to reconstruction, would appear so far beyond the task of the volunteer civil defense system that martial law planning on a large scale is required. There is little question that some type of temporary martial rule will be called for in the face of disasters of the scale envisioned under hostile atomic attack. Even such minor (by comparison) catastrophies as the Texas City disaster and periodic floods in various parts of the United States have required widespread help from the military services.

Tactical Troops Not Answer

What military agencies could perform this civil defense mission?

Tactical troops should not be diverted from their primary mission of carrying the fight to the enemy, except for the necessary emergency minimum. Headquarters of several of the Continental US Armies (for example, First, Fifth, and Sixth at New York, Chicago, and San Francisco) are within key target areas and are liable to destruction. With them would go a large part of the effectiveness of the troop concentrations within the continental United States under present arrangements. Even assuming that sufficient headquarters staffs escape to handle the troop situation, and that the use of the Army becomes mandatory (as seems inescapable), military forces presently are neither trained, organized, nor disposed geographically to do this job in optimum fashion. To rush an infantry regiment into a stricken area may provide a temporary police force, but little else.

Tactical troops can be used to supplement the efforts of special units under the supervision of the latter, but by themselves they would be only slightly better than the present civil defense volunteer organization. *Apparently what is needed is a nationwide Army Command responsible for dealing with disaster.* It should have specially trained units at its disposal.

It is beyond the scope and intent of this article to go into the question of whether the top command of civil defense should be military or civilian. The suggestion submitted here would be equally useful in either case and could be implemented under either type of top operational control. Only the local tactical control of these troops needs to be military, as does the over-all supervision of their training, supply, and deployment prior to actual attack.

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Tailored Units Needed

Consider a new and separate command similar to the nationwide Antiaircraft Command. It is envisioned, perhaps arbitrarily, that the Civil Defense Command would have a number of "Rescue and Rehabilitation (R/R) groups" tailormade for the primary area they are expected to serve. Depending on the size of the target area, its importance, and the likelihood of its being hit, one or more such groups would be assigned to it, each with precisely defined primary areas of employment and each capable of assisting the

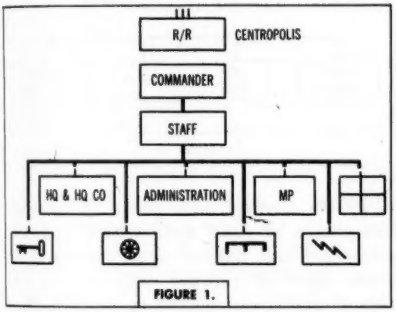

FIGURE 1.

others should its own area escape major disaster.

Despite the requirement for tailormade units these disaster groups would have certain similarities in general organization and functions. Each subordinate unit of each group would be required to initiate (and keep current) surveys of potentially helpful civilian agencies, both governmental and private, in the target area and throughout the surrounding countryside to a depth of several hundred miles. Emphasis would be on agencies which could help the group in the performance of its mission, particularly by recruiting personnel and requisitioning necessary equipment on a moment's notice. R/R groups also would be prepared to supervise the employment of attached military units.

Only detailed study and maneuver testing will indicate whether a R/R group for a particular area should be made up of platoons, companies, battalions, or a combination of these. For the purpose of discussion, however, a possible *basic* R/R group organization is shown in Figure 1.

As in the case of the group organization, a discussion of the various organizational elements of the subordinate units is more concerned with their nature, areas of interest, and probable functions than with the actual size or specific unit title. Elements of the various group units might be:

HEADQUARTERS & HEADQUARTERS COMPANY

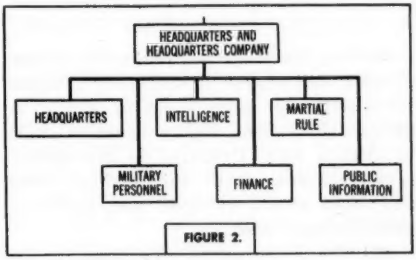

FIGURE 2.

Military Personnel.—Serves both active duty and USAR members of command.

Intelligence.—Includes Counterintelligence Corps detachment which keeps commander informed of potential disaffected persons and segments of populace; rounds up actual and potential saboteurs, agents, and collaborators in event of attack.

Finance.—Prepared to pay unit, issue vouchers for requisitioned matériel and facilities, pay civilians hired by other units, and restart essential fiscal services for civilian populace under direction of martial rule unit.

Martial Rule.—Prepared to provide all essential governmental functions, including courts, in affected areas and as required in refugee billeting areas. Unit composed largely of Judge Advocate Gen-

eral and Civil Affairs/Military Government personnel.

Public Information.—Performs peacetime public information duties. Prepared to provide emergency news media and distribution of news and orders of command to populace of affected area.

ADMINISTRATION COMPANY

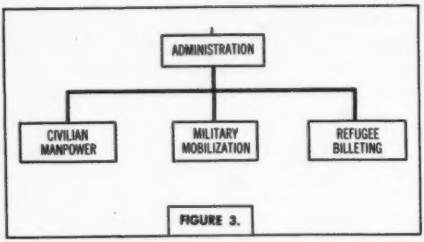

FIGURE 3.

Civilian Manpower.—Prepared to screen, classify, and employ up to 100,000 civilians for itself and other units of group in all capacities from highly scientific skills to kitchen help. Prepared to hire necessary personnel from surrounding areas and from among refugees and survivors within target area.

Military Mobilization.—Prepared to assist military survivors of all services, utilize them locally or send them to other units as directed by higher headquarters. Recalls surviving reservists within target area and surrounding countryside. Recruits personnel for duty from among veterans and others. Calls surviving National Guardsmen from within target area to active duty and assists in calling National Guard units from surrounding areas to active duty.

Refugee Billeting.—Determines, in advance, billeting capability of each city, town, village, and hamlet within a radius of several hundred miles. Prepared to house at least a half million homeless persons and to requisition necessary facilities (resorts, college dormitories, warehouses), designating certain of these as emergency hospital facilities (in coordination with medical company) and emergency prisons (in coordination with military police company). In coordination with the quartermaster company, prepared to arrange for feeding of refugees and for emergency issues of clothing and blankets. Prepared to set up and operate a locator service for family reunification and to assist civilian manpower section in locating people with desired skills.

MILITARY POLICE COMPANY

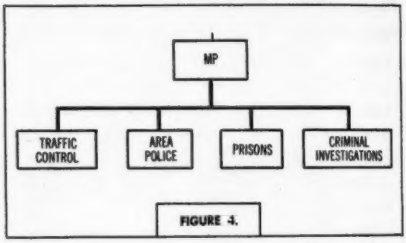

FIGURE 4.

Traffic Control.—On basis of thorough knowledge of road nets within and surrounding the target area, prepared to route flow of refugee vehicles out and supply and troop vehicles in. Controls traffic within target area.

Area Police.—Prepared to restore law and order within the target area and to assist in maintaining law and order in the refugee billeting area where number of refugees exceeds capabilities of local police. Working with civilian manpower, recruits all surviving peace officers within the target area and supervises activities of tactical troops sent in to help establish and maintain law and order.

Prisons.—Prepared to establish and operate emergency prisons for:

1. Serious offenders surviving from civilian and military prisons within target area.

2. Persons convicted by martial rule tribunals.

3. Persons committed by the intelligence sections for temporary detention. Constantly screens civilian and military pris-

ons in surrounding area for less serious offenders and trusties who could be organized into outside work gangs.

Criminal Investigation.—Prepared to perform normal investigative duties.

MEDICAL COMPANY

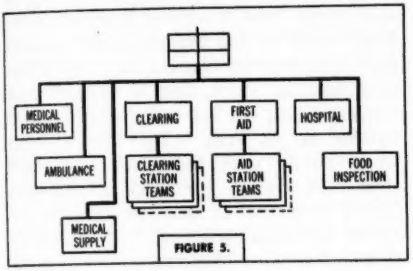

FIGURE 5.

Prepared to handle as many as half a million wounded and mentally disturbed casualties.

Medical Personnel.—Constantly screens and lists all medically trained personnel in and around target area and in refugee billeting area to include all physicians, dentists, pharmacists, registered and practical nurses, midwives, osteopaths, chiropractors, veterinarians, first aid instructors, psychologists, clergymen with psychological training, and bacteriologists. In cooperation with the civilian manpower section, prepared to recruit all such people for care of casualties in disaster area emergency hospitals and refugee billeting areas. Generally, during the first days after an initial attack of this nature there will be only enough physicians to supervise, advise quickly, and direct others who will have to do the overwhelming bulk of the first aid, emergency surgery, and emergency psychiatric care.

Ambulance.—Prepared to evacuate up to one-quarter of a million nonwalking wounded by all available means. Walking wounded will have to move out of stricken area with other refugees, receive some medical attention at aid stations along the way, and ultimately be treated as outpatients at emergency medical facilities in the refugee billeting areas. Coordinates with water transportation section of the transportation company to keep check on availability and whereabouts of river, lake, and coastal passenger vessels which can be used as hospital ships for evacuation of serious casualties. Coordinates with medical personnel section to provide medical personnel to staff hospital facilities. Coordinates with rail section for the conversion of Pullmans into hospital trains.

Clearing Station.—Organizes and trains teams to go into target areas and set up emergency clearing stations for evacuation of wounded, classifying wounded for air, motor, rail, or water evacuation or for movement with other refugees after emergency treatment. Stations would recruit and use all surviving medical personnel of all categories from within target area; would provide minimum facilities (largely sedation) for terminal cases whose condition would neither permit nor justify use of evacuation facilities.

Aid Station.—Established along evacuation routes for transient care of walking wounded (rebandaging, administration of antibiotics, administration of tranquilizing drugs for the mentally disturbed, and first aid for casualties of evacuation itself).

Hospital.—Prepared to establish and administer emergency hospital facilities in evacuation and billeting areas for treatment of patients evacuated from target areas.

Medical Supply.—Prepared to control and distribute medical supplies from depots around periphery, along evacuation routes, and at designated emergency hospital sites; inspect and requisition civilian supplies within and surrounding target areas as well as in the shelter areas. (Much of staffing would be civilian pharmacists hired by medical personnel. In peacetime these sections would ensure that adequate rotation of medical supplies was

maintained through liaison with military, governmental, and private hospitals and pharmaceutical supply houses in the areas concerned.)

Food Inspection.—Staffed by veterinarians and bacteriologists prepared to inspect requisitioned food supplies for radioactive and other contamination. (Not too many veterinarians could be spared for this duty because the majority would be needed to assist in treatment of the wounded. Medical personnel section would evaluate both requirements and apportion available personnel accordingly.)

TRANSPORTATION COMPANY

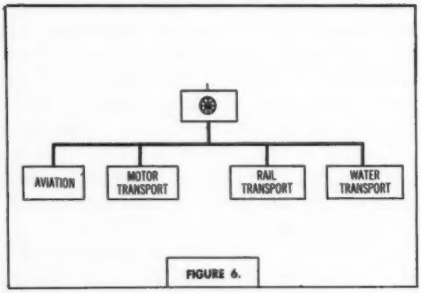

FIGURE 6.

Aviation.—Prepared to perform such missions as evacuation, reconnaissance, traffic control, and movement of key personnel. (Includes flying, maintenance, and air movement control personnel. Equipped with fixed-wing aircraft and helicopters.)

Motor Transport.—Prepared to conduct all types of motor transport operations and maintenance and to accomplish emergency procurement of ambulances and other special type vehicles.

Rail Transport.—Prepared to organize and operate railheads as close to target areas as existing facilities permit; supervises emergency reconstruction of essential rail lines to and within target area; coordinates with medical company in forming and dispatching hospital trains, and assumes military control of all railroad facilities.

Water Transport.—If applicable to given target area: Locates potential emergency beachheads within target area and at refugee areas if applicable (for example, New Jersey coastal resort areas for the New York metropolitan area). Prepared to direct immediate conversion of some ships from Merchant Marine reserve fleets, such as the Hudson River reserve fleet, into floating warehouses, repair depots, hospital ships, and to position such converted and stocked ships at safe points outside target area. (This section must work closely with the Navy and Coast Guard and, as a minimum, should have liaison personnel of those services permanently attached. Working with engineers, this section must plan and supervise emergency reconstruction of essential piers, wharves, and shipyards within target area and clear harbors of obstructions.)

ENGINEER COMPANY

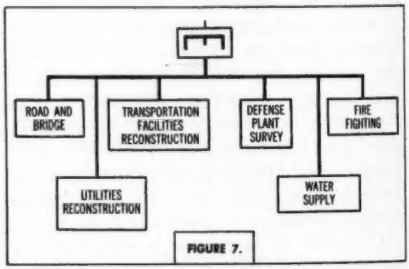

FIGURE 7.

Road and Bridge.—Conducts constant road reconnaissance within the target area and all approaches to and within refugee billeting areas. Prepared to undertake essential emergency reconstruction of necessary access roads and bridges.

Utilities Reconstruction.—Surveys all essential utilities plants within target area. Prepared to start essential emergency reconstruction of those which are salvageable and necessary to war effort.

Transportation Facilities Reconstruction.—Provides engineer technical support for the transportation company opera-

tions. (These engineer personnel could be assigned directly to the transportation company.)

Defense Plant Survey.—Prepared to move into target area as soon as possible after attack and survey essential defense production factories to permit guiding reconstruction efforts for maximum advantage to war effort. (Requires thorough advance knowledge of location, production, and *modus operandi* of all such plants in the target area.)

Water Supply.—Prepared to provide emergency supplies of potable water to target area, evacuation routes, and refugee billeting centers. Surveys all available water sources and sites emergency water supply points which will become operational when required.

Fire Fighting.—Prepared to organize all available fire fighting units of communities on periphery, lead them into target area, reorganize survivors of target area fire fighting organizations and volunteers, fight current fires, and organize (under the martial rule section) a new fire fighting organization for the stricken area. (This unit would be one of the first to enter target area. Its personnel, as in the case of the personnel of the other sections, must be thoroughly trained in detection of and protection against radiation dangers, a mission which will be a primary mission of this unit.)

SIGNAL COMPANY

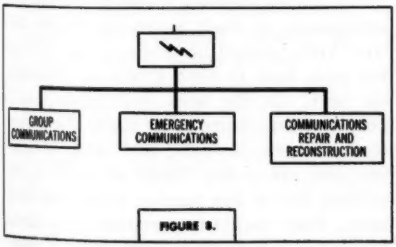

FIGURE 8.

Group Communications.—Prepared to provide communications for group and attached units.

Emergency Communications.—Prepared to provide emergency communications for target area to include support for the martial rule section and communications to billeting areas; assist PIO in dissemination of information to populace by means of radio and loudspeaker; place every amateur radio operator in the surrounding areas on standby basis; step up power (range) of local radio stations in smaller communities around the target area to provide substitute for destroyed radio facilities within target area. (Standard radio will be the easiest and best means of keeping the populace informed and directed.)

Communications Repair and Reconstruction.—Prepared to accomplish emergency reconstruction of essential facilities in target area.

QUARTERMASTER COMPANY

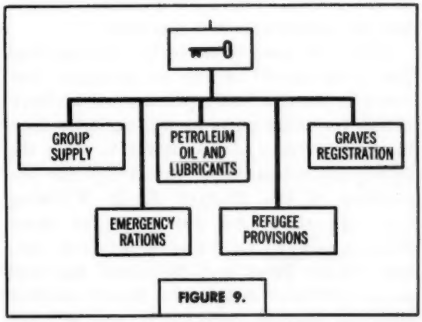

FIGURE 9.

Group Supply.—Prepared to support group and attached military units as well as to provide emergency quartermaster clothing and equipment to recalled reservists, military survivors of target area, newly recruited personnel, and (to a limited extent) civilian police recruited by or working with the group.

Emergency Rations.—Prepared to requisition and issue food (cleared by medical company) to troops and civilian population as required.

POL.—Prepared to freeze all supplies of petroleum, oil, and lubricants (working

with martial rule and military police) and issue as required for essential use. Special attention to be given to POL requirements of aviation and water transport sections of transportation company. Control distribution of bulk fuels for heating purposes, establishing priorities, when necessary (that is, hospitals and child refugee centers).

Refugee Provision.—Prepared to requisition and supervise distribution of clothes, blankets, and tentage to civilian refugees, under orders of martial rule section.

Graves Registration.—Prepared to supervise clearance of dead and emergency interment.

Possible Manpower Sources

The question naturally arises: Where will we get the personnel to man these groups and can they be supplied without sapping the strength of the tactical units of the Army? The answer is not simple, but the problem is not insoluble.

When the need is properly demonstrated the Army should be able to persuade Congress to provide extra manpower authorization for these units as was recently done in the provision of manpower to meet the added commitments of the Army for the support of the Distant Early Warning Line operation. All personnel for these R/R units need not be stripped from tactical units. First and foremost, age and minor physical disabilities should not bar men and women from such service. Considering the psychological trauma that will befall those charged with such a mission in the event of attack, middle age may prove to be an advantage, rather than a disadvantage.

The Army is releasing and has released numbers of good Reserve officers who wanted to remain on active duty but could not because they were over age in grade. R/R groups could have used many of them. In addition, many men retire after 20 years of service because they wish the stability of a fixed place of abode. Officers and enlisted men with 20 years of service who ask for and are found acceptable for duty with R/R groups could be assured that once assigned, they would not be transferred until retired. If found unsuitable for this duty, they should be allowed to retire rather than face involuntary transfer.

Stability Is Important

Indeed, it would be wise to lower the minimum prior service for such stabilized assignment to 10 or 15 years' previous service. These people would gain in value as they remained in place. No amount of card indexing—valuable as that is—would replace their personal knowledge of the terrain and the people with whom they must deal. They should be encouraged to settle and take firm roots in the communities on the periphery of the target areas near which their units are located. To the maximum extent possible they should be people who have their origins in the target area or its surroundings, or who have at least lived there for long periods of time. In times of stress familiar accents and mannerisms are more acceptable to a stricken populace.

Actually, there would be few privates in such units. The need would be for officers, warrant officers, NCO's, and specialists who would have to be prepared to supervise and direct hundreds and possibly thousands of others. Because the Army now has barely enough scarce specialists such as physicians, dentists, and judge advocates to meet current needs, no permanent assignment of such people from the Active Army should be made except for the top such man in each group or comparable unit. In the area surrounding each potential target are to be found many doctors, dentists, lawyers, and other specialists who are in the USAR or could be recruited into it for service with fixed R/R units. They should be recruited to a status requiring one or more paid drills a week, and their active duty periods should be so staggered throughout the year that some are always on active duty with the others

so assigned that they are about an hour's drive of their rendezvous points.

The mission of the R/R group would be to converge on the target area after an attack and begin essential operations as soon as possible. Therefore, it must be based in and near communities far enough out of the target area so that it can survive attacks thereon, including near misses. It should have its own deep shelters for men and equipment so that it can survive yet be close enough to be able to get into the target area without too much delay.

Once such Active Army units are operational and we have maneuver tested them to determine optimum organizations, USAR and National Guard equivalents should be organized still farther out of the target areas with the mission of reinforcing the Active Army R/R units and/or replacing them if they become casualties to subsequent attacks.

None of this discussion presents a cheerful prospect, but at least it represents a more realistic appraisal of the survival problem than does the present organization (or lack of it). In the last analysis the existence of such units would themselves serve as an active deterrent to this type of attack since our enemies would be put on notice that no matter how hard we are hit, we are prepared immediately to reorganize, reconstruct, and carry the war back to them. The discipline, self-sacrifice, and organization required for this task cannot be supplied in a democratic society by any but the armed services, and of these the Army is best fitted for the task.

We live in an age of peril.

We must think and plan and provide so as to live through this age in freedom—in ways that do not undermine our freedom even as we strive to defend it.

To watch vigilantly on the military front must never mean to be blind on the domestic front. In our present world—in this kind of prolonged tension and struggle—a crippled industry or a demoralized working force could be the equivalent of a lost battle.

President Dwight D. Eisenhower

Incalculable Factor

Major Reginald Hargreaves, *British Army, Retired*

. . . fickle as a changeful dream;
Fantastic as a woman's mood,
And fierce as Frenzy's fevered blood.

—Scott

IT WAS James Wolfe who affirmed that "War is an option of difficulties." With equal truth he might have added that it also is an option of risks.

There is the risk your plans may have been anticipated; that even if you do take the precaution of refurbishing them, they may not work out as intended. There is the risk that you may have miscalculated the enemy's intentions, his present strength, and his immediately available resources. In addition, there is the abiding and virtually incalculable risk that the meteorological conditions under which you hope to fight may turn out to be entirely different from those the experts have assured you may reasonably be anticipated.

Of them all, perhaps the weather hazard is the most capricious and difficult to deal with should it turn in your disfavor. War is a matter of movement, and movement lies always at the mercy of the weather. "A good road," the French Foreign Legion saying runs, "is worth two battalions"; and a spell of fine weather may well be worth a couple of divisions.

Bad weather is a curse to both sides, but as a rule proves far more hampering to the side taking the offensive than to that standing up to meet attack. But there are exceptions to every rule, and a striking example of substantial, if inadvertent, aid being furnished to the offensive is to be found in William of Normandy's conquest of England.

Saved by Bad Weather

The "Bastard of Falaise" had appointed the mouth of the Dive—a small river between the Seine and Orne—as the primary rendezvous for his ships and forces, and there the armament duly assembled. With the prevailing southwesterly wind, William anticipated no difficulty in moving up channel to St. Valéry, a more convenient point from which to launch his invasion. But the weather proved contrary, and for a solid month the duke was kept fuming in port.

At last the wind veered, to blow steadily from the right quarter; and with William in the van, the armada set out for the passage of the narrow seas, anxious eyes alert for the first sign of the formidable Saxon fleet which was known to have been assembled at Sandwich.

But not a single hostile vessel appeared to challenge the Norman's crossing. With the first days of September Harold's fleet had ceased to exist, "for the season of provisioning had begun," records the *Anglo-Saxon Chronicle*, "and no man could keep them there any longer." In effect, for want of the proper root crops to carry the

War is a matter of movement, and movement always lies at the mercy of the weather. The importance of our meteorological intelligence and its speedy communication in any future war must not be minimized

herds over the winter, all but the sturdiest cattle had to be slaughtered, salted, and barreled to provide meat for the winter and early spring—a task in which everybody lent a hand, even including the shipmen.

Unimpeded, William brought his army safely ashore, and the outcome of the encounter between his seasoned troops and the raw militia of the *fyrd*, insufficiently stiffened by a handful of *huscarls*—the only professional men-at-arms in Harold's train—was virtually a foregone conclusion.[1]

The delay at which the duke had railed so furiously actually had served to eliminate the one factor the landlubber Normans, in their hastily carpentered vessels, had legitimate reason to dread—and it had been a holdup entirely attributable to the weather.

A Constant Ill Wind

The English Channel again played a malignantly frustrating part during the Hundred Years' War, when an English garrison, besieged in Thouars, was under pledge to surrender if not succored by Michaelmas.

Although no longer the forceful commander he once had been, Edward III bent all his dwindling energies to the task of organizing a relief force designed to reach the beleaguered stronghold well ahead of the date set for capitulation. By 20 August the armament was ready to set out from Sandwich. Then for five weary weeks the unhappy sovereign sought to beat his way down channel in the teeth of a strong southwesterly wind[2] that never veered; and with the time-limit overshot, the enterprise had to be abandoned and Thouars left to its fate.

In 1627 reinforcements and supplies for Buckingham's ill-advised and ill-designed expedition to the *Isle de Rhé* were held up by equally contrary winds, with the result that the venture foundered miserably.

Indeed, right down the centuries vessels constantly were being held up in the Downs or compelled to seek hindering refuge in the shelter of Spithead or Plymouth Roads, with consequences on the prosecution of warlike operations that were invariably damaging and sometimes fatal.

Island land forces, unless they act exclusively as a home defense army, always must be at the mercy of the navy that transports and supplies them. When that navy itself is at the mercy of persistently unfavorable meteorological conditions, a premium is put on recurrent disaster. So matters continued until the chancy era of sail gave place to the more reliable days of steam.

Mud No Friend of Armor

Edward III at the Battle of Crécy was aided as much as his adversaries were hampered by the heavy rain that fell some time between 23 and 25 August; for the English were posted on a concave slope commanding the *Vallée des Clercs*, a depression which was soggy everywhere, and in that sector below the village of Wadicourt not far short of a quagmire. The French did not arrive on the scene of action until late in the afternoon; but once in sight of their opponents they were confident that one good rousing charge would rout the small force confronting them.

But there were to be no rousing charges over the heavy going of the *Vallée des*

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[1] Harold's troops were not properly mustered when battle was joined, many of them straggling in during the course of the action.

[2] The mid-17th century mariner, Richard Gibson, wrote, of the channel, "The wind bloweth above three-quarters of the year westerly," and conditions have not changed.

Clercs, rendered even more glutinous by a heavy thunderstorm which drenched both sides—and the ground—just as the first fierce onset was about to get under way. As the Horse advanced, the unwieldy destriers, cumbered with their own armored protection and weighted with the steel-clad knights and men-at-arms astride them,[3] were slowed down long enough in the muddy bottom to present a perfect target for the bowmen, drawn up in a demilune on the slope, and the slaughter was appalling. Fifteen, possibly 16, times the flower of the French, German, Austrian, and Lorrainer chivalry—dazzled by a burst of evening sunlight shining right in their eyes—sought to thrust home a charge. But the ground was too muddy, the rain of arrows too persistent and accurate, and the press of retreating cross-bowmen too hindering. Each attempt only added to the jumbled pile of slain.

Philip of Spain's first Armada was delayed in its ports by contrary winds long enough for Howard of Effingham to prepare a thoroughly warm welcome for it, and the second Armada met with such a violent gale that it was blown back on its own shores in ruin and never heard of again.

In the blood-drenched "cockpit of Europe," operations were always at the mercy of climatic conditions that varied all the way from just tolerable to plain ghastly—which may, in part, account for the fact that "our men swore terribly in Flanders!"

Tallard Guessed Wrong

At Blenheim the Duke of Marlborough deliberately decided on a frontal attack across boggy land soaked so recently by a downpour that Tallard believed it impassable, especially by cavalry, and refused to accept that an assault along this avenue of approach was actually in preparation. Yet on the actual day of action the sun blazed out of a sky of brass and the men's exhaustion from the steaming heat seriously delayed Prince Eugene's deployment on the extreme right of the British line.

Marlborough's fixed belief in war of movement—which rendered him least effective in siege operations—caused him to chafe impatiently at the prolonged suspension of activity imposed by the traditional retirement into "winter quarters." But his own insistence on "subsistence" keeping pace with the army—which entailed a long train of bread wagons, sutlers' carts, and "beef on the hoof"—militated heavily against the very mobility it was designed to enhance. This was a problem in which the condition of the roads had the final word, and under the Low Countries' drenching skies the highway was often little better than the countryside it traversed.

New England No Exception

The New England States of North America can experience weather conditions as vile as those endured in the European cockpit, and the meteorological vagaries peculiar to the local theater of operations exerted no inconsiderable influence on the course of events throughout the War of Independence.

The end of the "setpiece" Long Island battle, for example, found Washington's troops hemmed in with their backs against the narrows separating the island from the mainland, a strip of water normally accessible to the ships of the British Navy. In the circumstances the task of putting the survivors "in the bag" appeared to offer no particular difficulty, which may account, in part, for the leisurely way in which "Good-natured Billy" Howe set about the process of "mopping up."[4]

Both tide and breeze, however, elected to

[3] A fully barded horse was carrying a load of metal of between 350 and 400 pounds, in addition to the weight of his armored rider.

[4] Since the possibility that negotiations leading to a settlement of the whole sorry business could not be entirely ruled out, Howe was rather concerned to "teach the rebels a good sharp lesson" than achieve too humbling a victory.

work on behalf of the survivors of Stirling's and Sullivan's Continental divisions. A furious northeasterly wind and a strongly flowing tide saw to it that Admiral Howe's warships kept well clear of the points of evacuation.

Then, as the wind modulated, a helpful blanket of fog came down over the Brooklyn heights. Under its cover the men of Glover's 14th Continentals, recruited almost exclusively from among the resourceful fisherfolk of Marblehead, got to work with every boat on which they could lay their hands. In the outcome, all but three[5] out of an army of close to 9,000 they had set out to evacuate were safely brought away, thanks, in no inconsiderable degree, to the elements that fought so stoutly in their favor.

Washington Gambled

Washington's Noeltide dash across the Delaware affords a striking example of an attempt to turn peculiarly unpropitious weather conditions to the advantage of a warlike enterprise.

At the moment the country was sorely in need of a successful stroke to offset the superiority established by Howe earlier in the year in New York and on the Hudson. Moreover, the time was drawing near when the limited period of engagement entered into by many of Washington's troops would come to an end, whereafter it would be impossible to keep them under arms. So, despite meteorological conditions that would have deterred 99 men out of 100, Washington resolved to strike a blow that would restore the prestige of the Continental Army and in so doing ensure a fresh intake of much-needed recruits.

In bitter cold and a blinding snowstorm the American forces set out, in three contingents, to cross the Delaware where miniature ice floes rasped and jostled in a turgid stream. Baffling pockets of mist helped to lead two of Washington's columns astray, but the third, under the commander in chief himself, contrived to make the passage of the Delaware and surprise the negligent Hessian garrison of Trenton which was put utterly to rout. But even among the Marblehead fisherfolk, again on hand to take charge of the boats, there was many a victim of exposure, while at least two unfortunates were frozen to death in the bitter struggle to cross the Delaware.

[5] The three not evacuated had disappeared on a looting expedition.

Heat and Cold Enemies

The other extreme of climatic vagary was reached at the Battle of Monmouth Court House where over 50 of the Continental troops fell victim to heat apoplexy and exhaustion, with a proportionate number of deaths from similar causes among the ranks of the British.[6]

Napoleon has been much blamed for committing his troops to the terrible retreat from Moscow of 1812. But the disaster originated in a slowing down in the original timetable which operated to bring disaster on his head—and death to the thousands caught in the implacable grip of Russia's icy winter.

Rain is, perhaps, the most demoralizing, as well as the most frequent, among the meteorological handicaps that warfare experiences. Not only does it gravely hamper mobility, but the morale of troops long exposed to the ailments and discomforts it engenders inevitably suffers a steady decline. Under active service conditions, however, there is very little that can be done about it, for few countries would be prepared to emulate the Chinese, who used to include umbrellas in their list of battle equipment, although such equipment has been used, and in combat, by the British and the Boers. Indeed, in the days of the old Imperial Chinese armies umbrellas consistently made their appearance in action, as well as on the line of march. A contem-

[6] Probably the highest casualty rate from thirst, exhaustion, and heat apoplexy was incurred at the battle of Hattin, or Tiberias (4 July 1187), the great turning point in the Crusades.

porary print in the author's possession depicts the Chinese defense of Pyongyang, the Korean fortress on the western bank of the Tatung River, which played so important a part in the Sino-Japanese War of 1894. In the distance the Japanese are shown advancing through a downpour of rain; while in the foreground Chinese riflemen are blazing away from the battlements of one of the outworks, sheltered by umbrellas held over their heads by "bearers" whose own firearms are slung—butt uppermost to keep out the rain—over their shoulders.

Captain Gronow in his *Reminiscences* records that at Bayonne, with heavy rain falling, an aide-de-camp galloped up to the brigade with the message:

Lord Wellington does not approve of the use of umbrellas during the enemy's firing.

The diarist goes on to add:

Colonel Tynling a few days after received a wigging from Lord Wellington, his lordship observing, 'The Guards may in uniform, when on duty at St. Jame's, carry umbrellas if they please; but in the field it is not only ridiculous but unmilitary.

Wellington's strictures were obviously ignored by the Horse, however; for writing of the skirmish at Croix Dauradet the French officer, Captain A. M. de Montebel, records that:

. . . the enemy hussards advanced rapidly towards our Cavalry. It was raining, and the English Officers were on horseback each with an umbrella in his hand, which seemed to me eminently ridiculous. All at once the English closed their umbrellas, hung them on their saddles, drew their sabres and threw themselves on our Chasseurs, who defended themselves bravely; but their mounts lacked the vigour of the horses of their adversaries.

In plain terms, they turned tail; a fact which did not deter Marshal Soult, a witness of their flight, from including a bewildered comment in his official dispatch on the unlooked for *élan* and resolution displayed by *les effeminés avec leur parapluis.*

South Africa can indulge in rainstorms of tropical intensity; and in the Boer War of 1899-1902 the hardy *vortrekkers* who took the field under Botha, De La Rey, and De Wet invariably included an umbrella in their active service equipment. When the youthful Winston Churchill was captured by Louis Botha he recorded that:

We continued to plod along until we reached the general gang of prisoners, and found ourselves in the midst of several hundred mounted Boers, who streamed into view, in long columns of twos and threes, many of them holding umbrellas over their heads in the pouring rain.

Rain Won at Passchendale

Few military enterprises can have suffered so severely from the effects of persistent rain as the British offensive at Passchendale in the late summer of 1917. Analysis of the general situation revealed that matters were going far from well in the home waters of the English Channel. Indeed, the First Sea Lord, Admiral Jellicoe, did not hesitate to affirm that the navy could only regain command of this vital sealane if the submarine base at Zeebrugge was put out of action by land operations designed to take it from flank and rear.

Records of the meteorological "mean" in this particular sector were studied with the greatest care, and ultimately it was agreed that reasonably fine weather might be expected from, roughly, 4 June to the end of September. Plans were concluded, therefore, and all the British preparations pushed forward so that the operation could begin on 25 July.

At this point, however, General Antoine revealed that the six French divisions scheduled to sustain the northern flank of the offensive were not in position; neither had their artillery moved up, and in any

case would be later on the scene of action than the infantry they were to support. Chafing at the delay, the British commander postponed the date for the start of the operation for one week. And on 21 July the weather broke in a deluge of rain that went on and on without a moment's respite for weeks on end, until the low-lying terrain was nothing more than a quaking bog. To move off the tenuous duckboard tracks was to court drowning in liquid mud; it was a labor of Hercules to move up supplies; in the frontline it was impossible to keep weapons clean, food hot, or clothes dry. Visibility was virtually nil, the guns fired blindly through the pelting, ceaseless torrents; and the problem of evacuating the wounded was an unending nightmare. Ultimately, Passchendale "drowned out" at appalling cost in life and human misery, not because it had been ill-conceived and badly supported, but as a result of meteorological conditions it had been impossible to foretell.

Fog Can Help or Hinder

Far better fortune had attended the evacuation of the Gallipoli Peninsula in December 1915—on paper one of the most hazardous and potentially costly operations ever planned. The operation was carried through with a smoothness and punctuality that was enormously aided by the light of a waning moon, a sea as unruffled as a sheet of glass, and a light fog that in no way hampered movement, yet was sufficiently dense to shroud the beaches from the keen, watching eyes on the Turkish-held heights above. Some 124,000 men were brought away under the noses of the enemy.

Fog was a friend to the evacuation at Gallipoli, but in the main it is more likely to favor the assault than the defense, always providing that the attacking troops push on resolutely and without worrying too much about their flanks or rearward communications. It was the want of this almost reckless determination to infiltrate at all costs that stultified the surprise effected by the mist-enshrouded Russians at the "soldier's battle" of Inkerman, fought out before Sevastopol on 5 November 1854.

The right flank of the Franco-Turco-British position on the upland of the Chersonese was bleakly exposed almost the entire way back to the base at Balaklava, seven miles distant from the forward positions. Earlier, the Russians had overwhelmed the flimsy Turkish defense and would have been in Balaklava itself but for the magnificent work of the British Heavy Brigade of Cavalry and the impenetrable defense maintained by the "thin red line"[7] of the 93d Highlanders on whose bayonets the Muscovite assault had broken and crumpled into ruin.

Strongly reinforced and adventitiously aided by a heavy ground mist, the Russians tried again in the early hours of a dreary winter morning; sallying forth in two strong columns with the object of pinching out the isolated and numerically weak British 2d Division as a preliminary to rolling up the entire flank.

"Fire and Charge!"

Creeping through the murk, the Russian advance was almost on top of the pickets before they could open fire; and as the outposts fell back on their startled supports it was quite impossible properly to marshal the men in battle array, and they were pushed into the fight piecemeal as they came onto the scene. Little knots of redcoats, peering through the fog and drizzle, suddenly would find themselves confronted with a solid mass of the enemy, and only repeated charges with the cold steel served to break up the swarming battalions looming up on every hand.

The nearest British reinforcements, the Light Division and the Brigade of Guards, were on an inner ridge, separated from the scene of action by a deep ravine. It was quite out of the question to bring these troops into the fight in proper formation;

[7] "Thin red streak" in the original dispatch.

platoons and companies scrambled toward the sound of the firing and hit out at anything that looked like a Russian that emerged from the prevailing obscurity. The order of the day was, "Fire a volley and charge," and by this means the enemy columns were so vigorously handled that their advance—groping and wanting in confidence from the outset—was battered and broken, turned back on itself, and put to wholesale, headlong rout.

It was a very different story with Ludendorff's assault in the early hours of 21 March 1918. Launched against the overextended and thinly held positions of the British Third and Fifth Armies, the heavy ground mist that accompanied first light was just what the Germans wanted to give their infiltration tactics the maximum effect.

Ordered to stand fast on the positions they occupied, the British forward troops often found themselves simultaneously assailed from front, flank, and rear. But they held firm, and as the Germans sought to bring up their supports, the fog which earlier had so generously aided them worked steadily to hamper movement. Reinforcements lost direction; the artillery was forced to fire by the map; the attack lost impetus; and little pockets of Germans in their turn found themselves counterattacked from all sides.

With odds of more than three to one against them, the British eventually were thrown into retreat. Never again did the element of fog prove of such conspicuous aid to their enemies as throughout the first few hours of the initial onset.

Wolseley Took Care

Whether it was recollection of his unhappy experiences in the Crimea that made General Garnet Wolseley so careful in his planning, the fact remains that no one ever prepared a military enterprise with greater forethought or a sharper eye for contingencies—meteorological included.

With the 1870 Red River expedition for the suppression of the rebellious Louis Real, for example, Wolseley's first inquiry was regarding the weather conditions he would be likely to encounter; and his entire design was founded on the information he received. Investigation had revealed that the enterprise could only hope to keep the field for a definitely limited period. No start could be made until the ice of Lake Superior had melted, which usually happened early in May; while the return to base would have to be well under way before the approach of the October frosts. The river passage, incidentally, embodied 47 portages—some over a mile in length—over which everything would have to be manhandled.

Yet so well laid were Wolseley's plans, and so conscious was he of the meteorological hazards involved, that Fort Garry, the expedition's objective, was reached if anything a little ahead of time; the military purpose for which it had set out was neatly tidied up, and the whole outfit was back in Quebec before the earliest frosts had nipped the first leaves from the trees. Because they had been foreseen, the climatic conditions that could so easily have brought disaster, had been skillfully circumvented.

Frost and snow can impose handicaps as cruel and demoralizing as any other weather element, as Napoleon's unhappy troops on the road from Moscow made grim discovery. And there will be few men who experienced the white desolation and sword-keen Siberian winds lanc ıg down from the Korean hills who will be likely to forget their reactions to as severe a test of endurance as any troops have survived.

Yet it is with the amphibious operation—the forced landing in the face of the enemy—that meteorological considerations assume a gravity unknown in any other circumstances, for the element of the sea has intervened, with all its incalculable caprice, its sudden change of mood, and, for the landsman, its baffling unfamiliarity.

The Big Decision

It was the potential conditions at sea which constituted the determining factor at the time of the Normandy landing in June 1944. Tides were known to be right, but who could say what the sea would do? With the vast mass of small shipping, the unwieldy "Mulberry" harbors, and the necessity of delivering men with their vitality unimpaired with seasickness, reasonably fine weather throughout the passage across the ever-temperamental English Channel was a *sine qua non*. But as the appointed D-day drew nearer, the prospects of propitious meteorological conditions appreciably worsened and orders had to be sent out temporarily postponing the whole operation—a gigantic and hazardous task in itself.

On the originally scheduled D-day conditions on the selected beaches were such that, had a landing been attempted, the outcome could only have been disaster. But to the experts there were indubitable signs that the weather was temporarily clearing, although General Eisenhower's advance headquarters were still under the lash of heavy rain and shuddering to a violent wind. Whether to postpone yet again, or to follow the recommendations of the meteorological men and go ahead was one of the most difficult decisions a supreme commander ever has been called upon to make. But the outcome fully rewarded the courage which chose to follow the bold course which, as Nelson once averred, so often proves the safest.

In effect, the man who averred that "the weather is neutral," can have known very little about real soldiering.

Communications the Key

It is clear that under the conditions likely to arise in any future war, the meteorological man will continue to play a part of very considerable importance.

The degree of unreliability of the meteorological forecasts presented by news media can be attributed largely to the fact that they endeavor to cover conditions over far too wide a zone, and in any case reach the public long after the state of affairs they describe has undergone radical change.

Localized prognostication of distinctly limited duration, which cuts down the falsifying timelag, can be reasonably reliable. Providing this intelligence can be circulated speedily throughout a battle zone, its aid in the formulation of military plans can be invaluable. But speed of communication is the essence of the problem. The longer it takes to disseminate intelligence, the more it is subject to the law of diminishing returns. This is a matter of "communications," and "communications" under active service conditions are always chancy and difficult and frequently atrocious. With the tremendous dispersion the tactical employment of atomic weapons will inevitably impose, they will become even less reliable, since the greater the dispersion the greater the chance of connecting links to go wrong.

It would not be wise to minimize the importance of the problem of meteorological intelligence and its speedy communication to all concerned, and one can only trust that it is receiving the expert attention it so patently deserves.

The Army has achieved unprecedented ground mobility by means of new and versatile vehicles adapted to every kind of terrain from the frozen Arctic wastes to the desert and the jungle.

Secretary of the Army Wilber M. Brucker

Keep It Small

Major Thomas J. McDonald, *Ordnance Corps*
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In the May 1957 issue of the MILITARY REVIEW *Major Frank B. Case,* Transportation Corps, *discussed the problem of moving men and matériel onto and across a shore in operations conducted under missile fire and under atomic conditions or the threat of atomics. In the following article the author, also stressing the imperative need for development of concepts and equipment without delay, looks to the time when new vehicles in adequate numbers will balance the vulnerability of static transport systems with real aerial and terrestrial support mobility.—Editor.*

TOMORROW'S war may be an intercontinental exchange of thermonuclear missiles or a club and billy police action. It also may be a limited atomic war. This is the grave dilemma which confronts tactical planners, and their thinking for the future must be specifically tailored to meet each eventuality.

Logistical planners, on the other hand, know that they will face the *same* major problem regardless of the form war assumes: Ports, railroads, pipelines, and highway systems will be out of the military picture. Whether communications systems and facilities have been shattered

Technological breakthroughs offer prospects for a new line of communications for tomorrow's war. Thinking must be reoriented along the new lines now while there is time to work out the solutions required

by missiles or atomics, torn up by guerrillas, or simply are nonexistent in a primitive area, it will be impossible to rely upon static transport systems, the prime cargo carriers of peacetime.

This condition must be recognized while the complexity of new weapons and an increasing trend toward combat mechanization threatens to send logistical requirements soaring and while serious new problems are appearing with regard to forward area logistical operations.

Enemy weapons similar to those the US and her allies are developing will be capable of reaching, accurately and with tremendous lethality, deep behind the front, pushing supply points, maintenance units, and hospitals farther to the rear and forcing reductions in their size. Rear area security problems behind widely dispersed combat elements, casualties, the requirement to dig in, and confusion on a scale seldom encountered previously will complicate problems of logistical support. Furthermore, the fluidity of tactical movements promises to create a whole new concept of time and space in battle.

The old position form of warfare, where from day to day and week to week there was relative stability in the locations of combat units and their logistical support, is giving way to a dynamic ground, sea, and air mobility designed to cancel an enemy's numerical superiority in a nonatomic

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war and to provide the measure of survival on a nuclear battlefield.

Patton's plunge to the Moselle in 1944 and the airborne operations of World War II were harbingers of a new strategic, operational, and tactical mobility which has been eclipsed in the popular mind by atomic weapons. A revolution is taking place in transportation means—commercially, industrially, and militarily. The mobility part of the "firepower and mobility equation" is being upgraded radically.

Tactical planners will rely increasingly on this mobility at all levels of military thought. It offers, as an alternative to stationing masses of US ground forces permanently in all potential areas of aggression, the possibility of placing reliance on strategic reserves capable of rapid emergency commitment by sea and airlift. It will permit smaller ground forces to hold their own against far larger, less mobile opponents by permitting the rapid shifting of major elements to an area for more favorable commitment against an enemy incapable of responding in time to the changed condition.

All these factors will have far-reaching impact on logistical operations, but up to this time few of the innovations which make such a tremendous tactical difference have seriously improved logistics capabilities. Basically, over-the-beach operations, Red Ball supply systems, and mass airlift have been expedients—improvisations—highly successful, but expensive. The inherent limitations of these means have restricted them to use as a temporary substitute or an expensive auxiliary to the main cargo carriers.

But this is no longer completely true. New developments in the transportation field offer the same challenging possibilities to logisticians as the new weapons systems extend to tacticians.

Airlift for ground combat units is a vital element in defeating a stronger opponent who has the advantage of shorter interior lines of communication. This is particularly true when friendly forces are required to operate over extended distances, possibly in inaccessible, undeveloped areas. A serious obstacle to the routine use of aircraft, particularly for logistical purposes, and especially in fast-moving, fluid situations, has been the requirement for improved airfields. The tremendous requirement for engineer construction effort has militated against primary use of air in many situations. Improved techniques for airdrop have lessened this problem to an extent, but more recently far more promising concepts have come to the front. One of these is the water-based aircraft.

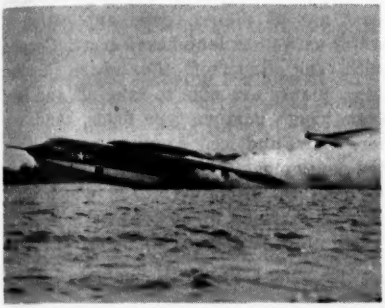
Jet airframe configurations, unlike propeller driven planes, enhance the characteristics of seaplanes while in the water. New concepts of hydrodynamic design favor the aerodynamic capabilities of the jet seaplane. New alloys which reduce hull corrosion, new equipment and techniques for berthing and handling, and for discharging and loading cargo all point to the seaplane as an efficient cargo carrier. Seaplane efficiency is enhanced by the fact that the heavy landing gear used for only a fraction of an aircraft's operating time and weighing six to 12 percent of a landplane's weight is not necessary.

Studies indicate that coastal waters, inland lakes, and rivers suitable for the use of seaplanes are available in every corner of the world—even in the most arid regions—and with a fraction of the preparatory effort required for landplanes.

Giant seaplanes with cargo capacities of 50 to 100 tons will have greatly increased cubage capacity with only marginal increases in materials, crew requirements, and basing facilities. Seaplanes of this type will have extremely shallow draft and capabilities for landing in moderate conditions of surface turbulence. Prototypes of such craft exist today in Martin's

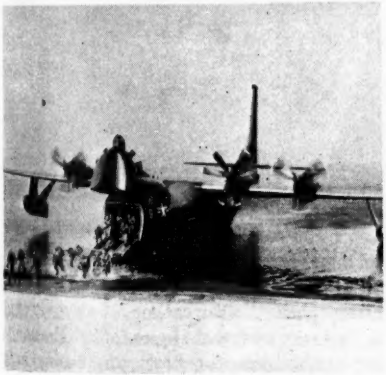
Seamaster, now under construction for the Navy, and the Convair *Flying LST*, presently in use.

Experts in this field seriously are con-



Martin Seamaster. **Bigger and faster seaplanes will give the Armed Forces far greater mobility.**

sidering construction of seaplanes large enough to be powered by a nuclear jet engine without hazarding crew or cargo to ra-

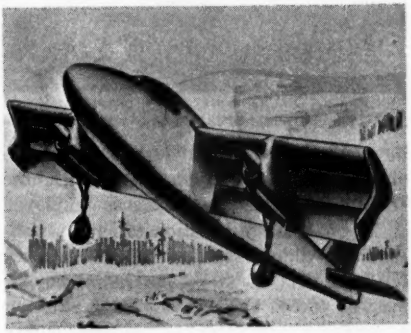


The Convair Tradewind (Flying LST) is a flying boat that can take off in 30 seconds and has a top speed above 400 miles an hour. It has 103 demountable rearward-facing seats and can carry an assault company more than 2,000 miles. As a hospital plane it can be fitted with 92 litters and as a cargo plane it can carry four 155-mm howitzers, three 2½-ton trucks, or six jeeps on its 88-foot cargo deck. In three minutes it can land, unload its cargo onto the beach, and take off.

dioactive effects. Such an atomic-powered craft conceivably could transport 500 tons of cargo or 4,000 troops a range of many thousands of miles at near sonic speed. It could make 300 trips a year between the US and a theater of operations carrying over 150,000 tons of cargo, 50 percent more than a conventional ocean freighter

This scene of Navy Martin Marlin flying patrol boats makes it easy to visualize a forward-looking logistical concept. With larger and more advanced types of seaplanes this could be a logistical base of the future—here now, but gone in an hour, long before it has been located as a target.

making the same haul 11 times a year. Foreseeable improvements in jet fuel engine systems, chemical fuel, and nuclear



This Ryan Vertiplane, being designed and developed for the US Army, utilizes two propellers driven by a single gas turbine. The large double retractable flaps can deflect the slipstream 90° to achieve a vertical takeoff and then be retracted as the plane picks up forward speed.

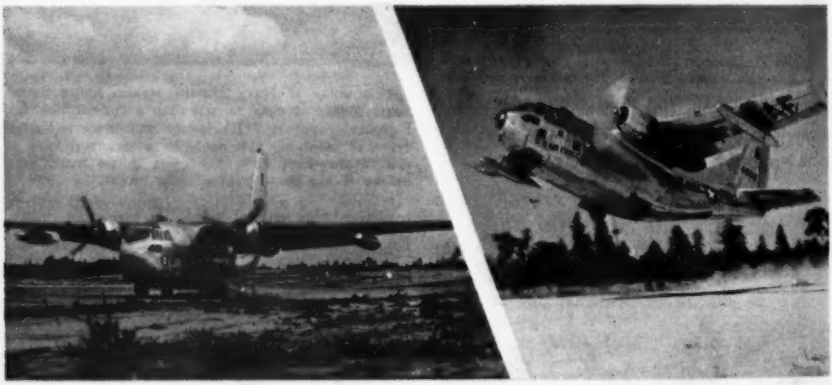
power all point to important new potentialities for the water-based aircraft.

The flexibility of such craft for logistical

use would be tremendous, permitting daily deliveries of support from the US directly to key areas within an active theater, minimizing reliance on static ports, stock levels of supply, and echelons of rehandling personnel.

A second and even more immediate concept offering logistical promise is the short takeoff and landing (STOL) or vertical takeoff and landing (VTOL) aircraft. Developments which were discontinued 15 years ago with the advent of jet aircraft have been approached anew with startling prospects. Fixed-wing principles include the *Flying Platform*, an application of the "ducted fan" principle; the vectored wing in which the slipstream of the propellor is employed to improve lift in addition to simply pulling the plane forward, and boundary layer control, a technique in which air may be forced through the wing surfaces to enhance lift. These developments are being pursued with success by aircraft companies in this country and abroad. Mechanical conversion concepts which marry the airplane and helicopter in a single design also offer promise.

The Fairchild *C-123* is landing eight tons of cargo on unprepared airfields 700 feet in length. Within a few years it is safe to say even larger loads will be landed on and lifted from fields 500 feet and shorter. These developments which bid fair to eliminate the heavy engineer construction effort which has restricted past use of planes, have application to water as well as land-based craft. Coupled with the Stroukoff *Pantobase* landing gear, planes are able to take off and land from rough pasture type fields, sand, water, snow, and ice. Another possibility is the development of a huge transport plane such as the proposed *C-132* which could carry a payload of 50 tons or more some 3,500 miles at a speed well over 400 miles an hour, landing and taking off from airfields of standard construction.



The Fairchild C-123 uses a minimum amount of undeveloped field for takeoff and landing.

Improved all-weather navigational equipment and techniques offer challenging possibilities for fleets of 10-ton craft operating continuously between theater ports of entry and forward area distribution points. Flying at 200 or 300 miles an hour at medium altitude with a range of several hundred miles, and capable of landing and taking off from almost any clear, open space such planes could deliver ammunition, spare parts, or critical plasma to transfer points in division areas and fly wounded troops and damaged matériel to the sanctuary of bases located

as far as possible from enemy missile launchers.

Ten such planes flying three sorties a day between a theater port of entry and a division 500 miles deep on a continental land mass could provide 300 tons of logistical support daily.

One seaplane carrying 100 tons of cargo in each of three daily sorties could provide the same support over far more extended ranges—perhaps at the speed of sound.

Prototypes of such planes have been flown and described in the aviation journals of all major airpowers. Jets consume voracious quantities of fuel, but improvements equivalent to those which have occurred in reciprocating engines during the last decade are expected. Although requirements for new rocket and missile weapons will demand a great segment of our airframe production capability, the use of atomic weapons in place of conventional bombs (and even the threat of these weapons) should reduce the over-all requirement for tremendous mass bomber fleets such as those produced in World War II.

The other important transportation development beckoning to the logistician as a more desirable prime carrier than static systems is the product of the commercial construction, earth-moving, and logging equipment industry. A new fleet of large-wheel vehicles are hard at work on highway construction projects the length and breadth of the United States. These giant vehicles move swiftly across rough terrain with the agility of far smaller vehicles and possess payload-to-gross-weight carrying capabilities far in excess of the rated capacities of conventional types. Their unusual off-road mobility, durability, and ease of maintenance have established them firmly in the industrial field.

In addition to offering major reductions in operating and maintenance personnel, repair parts, and logistical requirements, these vehicles can be made amphibious under load, according to technical experts who champion their use for military purposes. The name *Goer* has been chosen for this type of vehicle to differentiate it from the conventional truck. Industry-sponsored tests of existing commercial types indicate that they will *go* where conventional vehicles cannot and they can carry tremendous general cargo loads.

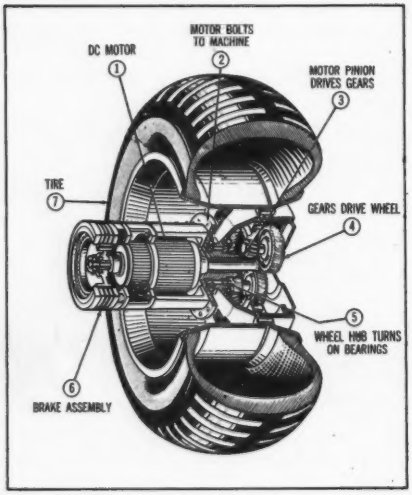
The principle which enhances their cross-country mobility is as simple as the difference between a roller skate and a bicycle being used to cross a rutted field. Large diameter, low-pressure tires (up to 10 feet in diameter) afford more ground clearance and better vertical obstacle

The Stroukoff Pantobase plane can land and lift cargo or troops from land, water, ice, snow, and unprepared fields.

The military applications of transporters such as this LeTourneau which can carry two tractors up a 40 percent grade are apparent.

crossing capability; have less rolling resistance and improved traction. Such tires run cooler, wear longer, and are less susceptible to ground puncture.

Another feature of present commercial equipment of this type is individual wheel electric drive which reduces breakdowns and maintenance requirements by eliminating almost all universal joints, associated splined slip joints, and seals. Elimination of the complicated mechanical power train (clutch, shaft, differential) is accompanied by removal of springs, shock absorbers, and bump stops. The large wheel tires take up the "jounce" and their large diameter eliminates the need for four or more wheel drive on 10-ton payload and smaller vehicles, while on larger vehicles from four to 32 wheels may be individually powered, thus providing a true all-wheel drive and maximum traction.



The LeTourneau electric wheel has made possible recent outstanding advances in the field of cross-country transportation.

Increased payload-to-weight ratio is achieved largely through exoskeletal design. (A building is exoskeletal—supported by its exterior structure. A human being on the other hand is endoskeletal—supported by an interior structure.) Floatation on inland waterways is proposed as an achievable military characteristic for these vehicles by rectangularly boxing the exterior dimensions, using the principles of exoskeletal construction. If weight is properly distributed for land use, adequate balance is likely to be present in the water. Elimination of the articulated power train and suspension system also contributes to increased payload and floatability.

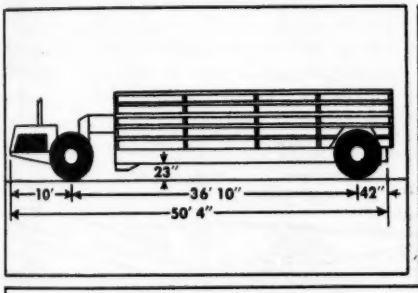
Another important feature of the current commercial vehicles of this type is positive powered king-pin (wagon) steer. Electrical or hydraulic steering power is applied at the king-pin connection between tractor and trailer, instead of at the wheel axle. In addition to making large wheels technically feasible, powered king-pin steer provides a capability for making a 180° turn in a roadway less wide than the vehicle is long. It separates steering from traction so that one does not compromise the other and improves traction in sand, bog, and rough going, permits highly effective "duck-walking," "creeping," and "tacking," allowing these vehicles to negotiate obstacles which immobilize conventional types.

The present general purpose fleet of military vehicles has been restricted in design by existing bridge, tunnel, and rail car size and weight sustaining characteristics. Every effort has been made to standardize designs of these trucks in a manner calculated to facilitate changeover of the Nation's production base from peacetime to wartime requirements. *While such considerations are important, it is increasingly apparent that a wartime vehicle fleet is needed to replace railway and highway systems with their vulnerable bridges, tunnels, and other choke points. To limit general purpose vehicle design to*

commercial criteria is to impede efforts to attain vital battlefield mobility.

The principal application of such a fleet to the large-scale logistical picture lies in the area from theater ports of entry to the forward combat area. Large *Goers*, with 35- to 50-ton payloads, would not be limited like railroad trains to a static track system or like conventional trucks to existing highway networks. They could move overland around obstacles and across rivers

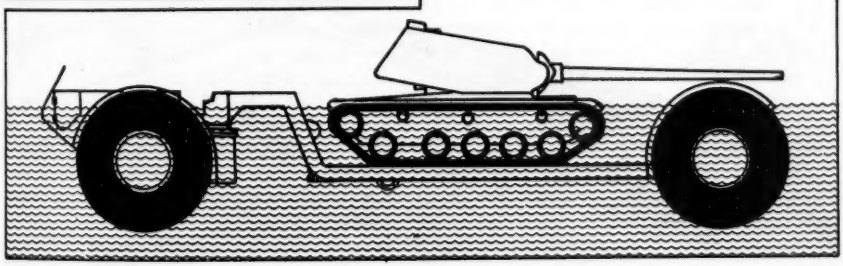
Such a transport fleet—*Goers* and *Pantobase* aircraft capable of operating from unprepared fields—would permit a tremendous reduction in airfield, highway, bridging, port, and auxiliary construction and in the maintenance of such facilities. *Ignoring the tactical potentialities of the above matériel concepts it is immediately apparent that such a transport system would not be limited to fixed routes, static terminal points which can be destroyed, or*



GENERAL CARGO MODEL
AIR LANDABLE FLAT BED

CHARACTERISTICS: AIR LANDABLE

TIRE DIAMETER	10 FT.
LENGTH	59 FT. 4 IN.
WIDTH	10 FT. 4 IN.
OVERALL HEIGHT	11 FT. 5 IN.
FLOOR AREA	278 SQ. FT.
STEERING RADIUS	44 FT.



The huge Goer with its 10-foot wheels can serve as a tank ferry or recovery vehicle. A variety of sizes and styles with a high payload-to-weight ratio will give the logistician a real mobility capability.

and other inland water bodies without bridging while carrying payloads of 50 to 65 percent of gross weight compared to 25 to 35 percent for conventional fleets.

At 30 miles an hour, moving individually or in escorted convoy, six giant vehicles of this type, each carrying 50 percent of its gross weight in payload—50 tons—could deliver 300 tons to a combat division. Driver and maintenance requirements would be little more than for smaller, less versatile carriers.

rigid movement schedules which can be disrupted readily. A system combining air and flexible surface movement (including coastal shipping by LST when feasible) would be capable of continued operation even when bridges were destroyed, tunnels closed, and major highway barriers created by the destruction of cities. It could operate over or through areas where security might be a serious problem. Routes and times could be altered continuously to confound enemy attack and

the responsiveness of the system could be maintained even in the face of mass destruction attack. The air or surface vehicles could be moved from the expected path of radioactive fallout and evacuation could be effected in the direction dictated by wind conditions.

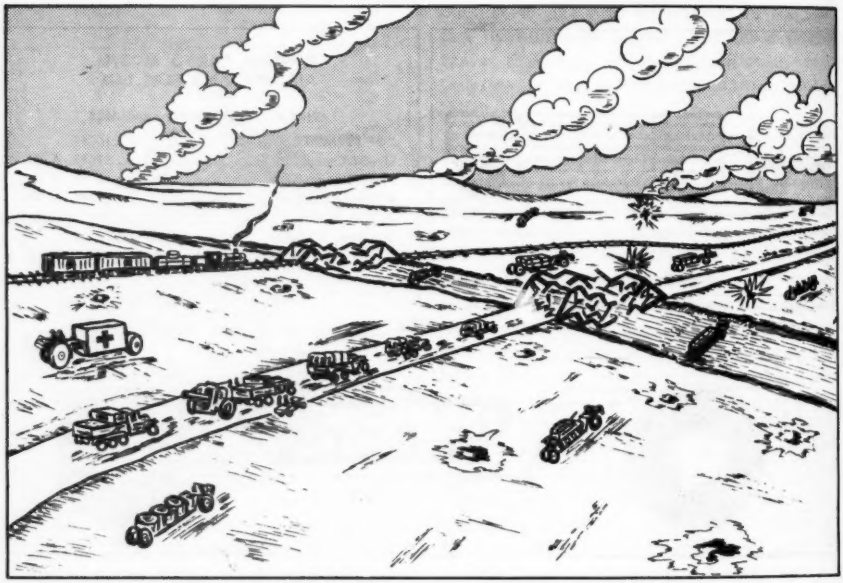
Admitting that antiaircraft weapons of new types, such as long-range surface-to-air and air-to-air missiles, can strike at transport aircraft and bypassed enemy units can attack truck convoys, the enemy probably will enjoy a far higher capability of disrupting static surface communications systems such as railroads and pipelines. Additionally, the effort to rebuild such facilities will be prohibitive under rapid, fluid combat conditions.

Railheads, marshaling yards, major ports, and pipeline termini lend themselves to easy map or aerial photo selection as targets. Attacks on such facilities not only halt a particular train or ship, but impede the progress of subsequent cargo through the system. Loss of a single ammunition train may block traffic on a railway system for days in both directions. Destruction of only one aircraft or a single large *Goer* would require a far higher level of attack planning and execution effort by the enemy.

In the long run, a continuous nonstop system of supply in small, highly versatile cargo carriers would be more economical, at least in military terms, than a system relying on gross tonnage static carriers.

In addition to economy of material and construction, and maintenance and operating personnel, reliance on a flexible rather than static system of support would permit reduction or elimination of logistical support echelons between theater ports of entry and forward support echelons.

The concepts discussed here would be



The Goer will keep the Army mobile if the static lines of the high-tonnage movers are disrupted.

supported by a number of allied developments in the field of containerization, "roll-on roll-off" shipping, and automatic data processing equipment such as that used in Project *Mass*.

The flexible logistics concept envisions development of two broad categories of requirements — *special* and *normal*. The *special* category, which would claim first priority for air movement, would include personnel and unpredictable, sensitive, perishable, small, and particularly *critical* supply requirements. Such requirements would be shipped from bases far to the rear in response to spot requests transmitted instantaneously over automatic data processing equipment. Shipment would be expedited by air movement directly to the area of use.

The *normal* category, which would move primarily by slower surface means, would include the predictable, noncritical, bulky, stable day-in, day-out type of supply.

Normal requirements would be moved regularly in accord with programs drawn up in the rear bases periodically, and approved with necessary modifications by the interested tactical headquarters. Most combat logistical needs fall in this latter category. Food, fuel, and most ammunition tonnages can be readily predicted for a corps or division size force. Loading could be accomplished to eliminate reloading or handling at intermediate points. Delivery could be directly from theater ports of entry to forward area distribution points. Shipments of fuel, food, and ammunition could be made from deep in the communications zone directly to a specific division or even, at times, to a smaller size unit. Savings in intermediate sorting and classification effort would be appreciable. Carriers could be given final routing in the forward area through radio or other means, providing a degree of flexibility which should pay real dividends.

It is even possible under such a system to visualize the logistical personnel operating in small well-dispersed complexes hundreds of miles behind the front, each small, self-sufficient complex supporting a specific corps-size force for all requirements and capable of assisting other supply complexes when necessary. The concept of 10-ton aircraft and 50-ton *Goers* favors a system under which special requirements could be moved forward to specific regiments and battalions directly from the port or beach area. The sense of identification between combat and logistical elements would strengthen the effectiveness of the system.

Under past doctrine, the ports, railheads, and pipeheads have drawn logistical facilities toward them like magnets, forming giant vulnerable concentrations such as Cherbourg or Pusan. The flexible transport system has just the opposite effect. A small port of entry base behind each corps-size force could be located far enough from enemy missile sites to facilitate countermissile action. Some could be offshore, others on the continental coast, still others on inland waterways. All operations could be coordinated by broad transportation allocations at the theater or lower level. The detailed flow of support could be controlled by small logistical staffs operating forward area transceiver units to relay requirements to logistical control centers in the base complexes. Army and other tactical echelons would be able to monitor, as necessary, on the same basis that a corps headquarters does today or to exercise a higher degree of control when necessary.

Instead of a hundred odd installations and logistical elements disposed throughout the field army area backed up by successive echelons of depots in advance sections, intermediate sections, and giant base complexes, the flexible line of communications would flow directly up to small, mobile forward area distribution and evacuation points. There, transfer would be made from air to surface vehicles or from *Goers*

of the 50-ton variety to smaller, equally versatile distribution vehicles. Some of these installations such as ammunition, fuel, and medical installations would be established on a branch basis. Others would be set up as composite facilities where common handling techniques could be used for rations, clothing, and certain other major items. Repair parts and replacement equipment would be delivered to direct support maintenance elements for distribution to combat units. These distribution evacuation points could be established at optimum distances behind the combat elements for normal pickup of supplies. They could be equipped with transport means to permit unit distribution directly to frontline units when conditions permitted. Casualty evacuation could be made by helicopter from the front directly to hospital type facilities with limited holding capabilities. From there patients could be evacuated rapidly by air to rear area hospitals.

These forward distribution points would function in much the same manner as supply points and Mobile Army Surgical Hospitals under current doctrine, operating in the corps area under actual control of the field army. It is important that unity of logistical control be exercised over the forward terminal points, the transport systems, and the supporting logistics base. This assures maximum flexibility in transport means and specialized logistical troop requirements as well as over-all responsiveness to field army requirements.

The problems of logistical support for tomorrow's war are manifold and complex. The tactical effectiveness of the ground forces, regardless of weapons and equipment effectiveness, will be no better than the logistical system behind them. Technological breakthroughs offer real prospects for a new line of communications designed to meet the needs of tomorrow, not yesterday. Thinking has to be reoriented along the new lines now while there is time to work out the many solutions that will be needed.

There are indications on every hand of the increasing technological capabilities of the Soviet Union. Air transport, including a highly effective helicopter fleet, is being integrated into Soviet tactical and logistical doctrine. Considerable attention is being devoted to increasing the over-all mobility of Soviet forces, particularly ground elements, by the addition of cross-country carriers and supporting aviation.

It has become increasingly apparent that our tactical ground elements must be reduced in unit size, dispersed extensively in width and in depth, and afforded every opportunity to keep moving instead of digging and awaiting a nuclear attack. Under nonatomic conditions against a grossly superior force, mobility and dispersion will make the difference between being overwhelmed on position or fighting a highly evasive delaying action calculated to inflict serious losses on the larger, less mobile force. Peripheral war may be in an undeveloped area, initiated with a minimum of preparation time. In all these tactical situations the watchword will be "Keep it small and keep it moving!" The logisticians have the same big problem regardless of the form war takes, but the solution is at hand. Foresight and forceful leadership in shaping this solution now will pay tactical dividends in tomorrow's war.

In the field of transportation the objectives are to exploit fully the transportation possibilities of the air age, and to foresee fully the transportation difficulties of the atomic age.

Lieutenant General Carter B. Magruder

MILITARY NOTES AROUND THE WORLD

UNITED STATES

Lighter-Than-Air Record

Endurance and distance records for lighter-than-air craft have been established by one of the Navy's *ZPG-2* patrol blimps. In setting the records, the blimp was aloft for more than 264 hours and traveled 8,218 miles. The 343-foot airship, which is filled with a million cubic feet of helium, made the flight as a climax to

***ZPG-2W* airship**

a long study of the aircraft's all-weather capabilities. The *ZPG-2* is powered by two 800-horsepower radial air-cooled engines which are mounted in an engine room within the car, and by means of shafts and gears drive two three-blade propellers. In an emergency either engine can drive both airscrews. The four control surfaces of the airship are mounted at 45-degree angles from the vertical and horizontal, and are capable of either manual or automatic operation. One version of this airship, the *ZPG-2W*, is equipped for early warning and has a large radar dome containing special electronic devices for aircraft detection on top of the envelope.—News item.

'Sidewinder' Demonstrated

In the first public demonstration of the Navy *Sidewinder* missile (MILITARY REVIEW, Dec 1956, p 64), a fighter aircraft knocked a drone target plane from the sky with its first shot at a distance of two miles. The nine-foot-long *Sidewinder*,

***F9F-8* with *Sidewinder* missile**

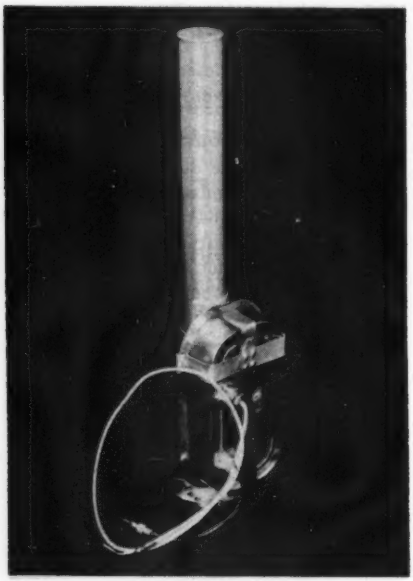
which reportedly costs less than $1,000 each, operates on a "heat homing" guidance system. The Atlantic, Pacific, and Sixth Fleets are equipped with the new missile which is said to extend greatly the kill range of a fighter or bomber.—News release.

Aircraft Contracts

A 47 million-dollar contract for delta-wing *F-106B* all-weather interceptors has been announced. The *F-106A* model of this aircraft, which carries the most advanced armament and fire control system yet developed for interceptor aircraft, is currently under flight test, and will go into production under a separate 216 million-dollar contract.—Official release.

Emergency Signal Device

A completely transistorized ultra-high frequency beacon transmitter, designed primarily as a military emergency signaling and communications device, is so small that it is enclosed in a standard size sardine can. The device uses printed circuits throughout, and can send radio signals continuously for a distance of approximately 25 miles for a period of 24 hours. It is designed to operate at a frequency of from 280 to 322 megacycles, but can be modified for voice or code transmission at other frequencies. The antenna of the tiny radio set is enclosed in a one-foot-high hermetically sealed tube. In operation, it is extended into a three-foot-high antenna mast surmounted by a 12-inch radial aerial.—Commercial release.



Sardine can radio transmitter

Colored Smoke Grenade

A small pocket-size colored smoke grenade has been developed especially for the use of airborne troops. About the size of a one-ounce tobacco can, it weighs less than one and one-fourth pounds, and is available in five colors rather than the three of the older heavier grenade. It will be used by paratroopers to signal aircraft over head and to mark landing and drop zones.—News item.

Submarines Named

Of the 15 nuclear-powered submarines now authorized, contracts or project orders have been issued covering 14 of the modern underseas vessels. In addition to the *Nautilus* and the *Seawolf* which are already built, these include the *Skate*, to be launched this year, the *Swordfish* and *Sargo*, to be completed in 1958, the *Triton*, a giant picket submarine, and the *Skipjack, Scorpion, Seadragon, Halibut, Scamp, Sculpin, Snook*, and *Shark*. The *Shark (SSN 591)* will be an attack submarine with an *Albacore* type hull, and will cost 24 million dollars.—Official release.

Aerial Refueling Kit

Quick conversion of Navy fighters and attack bombers into aerial tankers will be possible with a newly developed, self-contained refueling unit. Already flight-tested and in production, the torpedo-shaped refueling unit is in use on the *AD-6 Skyraider* attack bomber and the *A4D Skyhawk* jet bomber. The 17-foot-long refueling package does not rely on the "mother plane" for power, but has its own ram-air turbine driven by a four-blade propeller

in its nose. Besides the turbine, the refueling store contains hydraulic motors, a fuel pump, a flexible hose on a reel, a collapsible drogue, and fuel. It is carried under the fuselage and can be jettisoned in an emergency. Aircraft using this device for conversion into tankers can be restored to normal combat functions quickly

In-flight refueling system

by removing the package. In addition to the conversion of an undisclosed number of *A3D's* for fleet use as tankers, all *A3D's* are to be equipped with probes so that they may be refueled in flight.—Commercial release.

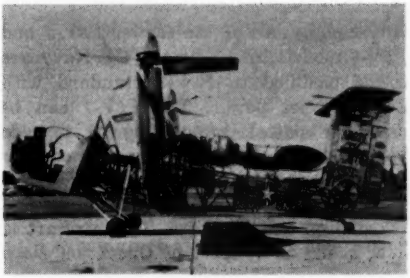
Air Transport Reorganized

The recently reorganized Military Air Transport Service will take over the 534 planes operated by the existing interservice MATS, and, in addition, will be enlarged by three wings of heavy *C-124* troop carrier aircraft of the Eighteenth Air Force and certain four-engine aircraft of the Navy's fleet logistical wings. The new agency commences operations with 717 aircraft, and probably will have three wings of Air Force medium transports turned over to it. A heavy wing has 36 planes and a medium wing 48. Eventually the new agency is expected to have control of about half of the 4,000 heavy lift aircraft available.

Two reserve tactical bomber wings and three reserve fighter-bomber wings will be reorganized and equipped as troop carrier wings. Additionally, two Air National Guard tactical bomber wings will be redesignated fighter-interceptor wings. With these changes, the Air Force Reserve will have 18 troop carrier wings and six fighter-bomber wings. The Air National Guard will have eight air defense wings equipped with all-weather fighters, 17 fighter-interceptor wings, and two tactical reconnaissance wings. By October of this year it is anticipated that more than 350 *C-119* transports will be assigned to reserve troop carrier units, and a number of *F-86-H* jets will be going into the remaining fighter-bomber wings.—News item.

Tilt-Wing Test

Shopwork on the *Vertol 76*, a tilt-wing VTOL research aircraft, has been completed and functional tests have begun. The wing and two counterrotating propellers of the experimental craft are tilted as a unit through a 90-degree arc for vertical takeoff and landing or for level flight.

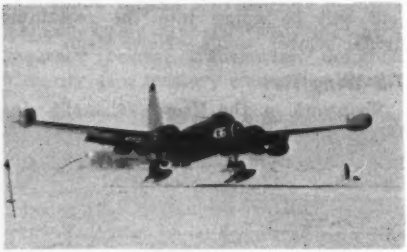


First model of tilt-wing plane

Conventional airplane controls become effective when the wing is tilted to a horizontal position, and two ducted fans in the tail section control yaw and pitch when in vertical flight. Since the wing may be rotated to any desired position between vertical and horizontal for takeoff or landings on shorter runways, or when the plane is carrying a heavy cargo load, the plane also is designed to have STOL characteristics. The powerplant used in the *Vertol 76* is a *T-35* two-stage, turboprop engine.—Commercial release.

Versatile Patrol Bomber

Various models of the Navy's *P2V Neptune* patrol bomber are in use by the air forces of Great Britain, Australia, Canada, and the Netherlands; by the French Navy; and by the Japanese Maritime Defense Force. The latest model of this aircraft utilizes two wingpod-mounted *J34* turbojets of 3,400-pounds thrust each to augment takeoff and combat performance.

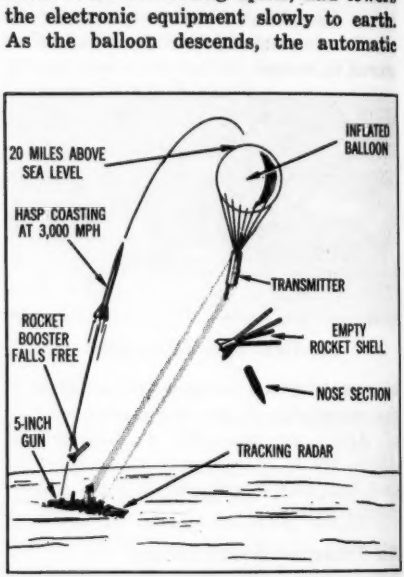


P2V-7 landing on snow

Additionally, all of the earlier *P2V-5* and *P2V-6* models in use by the US Navy are to be modified to *P2V-7* standard with auxiliary jet power. The *P2V-7* can be used for patrol, minelaying or torpedo bomber duties, and has been equipped with 5-foot-wide and 16-foot-long skis on its main landing gear for use in landings and takeoffs on snow and ice. This aircraft is now in use in support of Operation *Deep Freeze* in the Antarctic.—News item.

Rocket Converted

A high-speed antiaircraft rocket has been converted into a collector of weather data for naval shipboard use. The high-altitude sounding projectile, *Hasp*, is a single stage, solid-propellant rocket that can be fired from five-inch naval guns. The rocket motor and the dart, or smaller forward part, ascend as one unit to about 2,600 feet, at which point the propelling charge burns out, and the rocket booster falls back to earth. The dart coasts upward to more than 100,000 feet in approximately 80 seconds. A timing device in the dart's nose splits open the casing at the summit of its flight, and ejects instruments to detect temperature and humidity in the ionosphere. A balloon is inflated when the casing splits, and lowers the electronic equipment slowly to earth. As the balloon descends, the automatic



Naval weather rocket

transmitter-receiver supplies weather data to an electronic computer aboard ship. The new system is expected to speed up the collection of weather data considerably, since it takes the *Hasp* only about a minute to reach an altitude that it took the old-style, gas-filled balloons more than an hour to attain. It can be tracked in flight by standard shipboard fire control radar.—Official release.

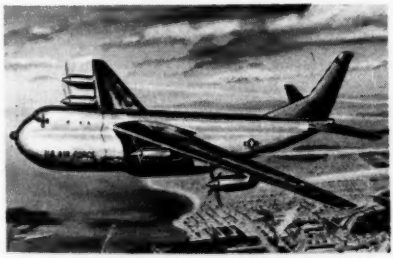
Warship Construction

A nuclear-powered guided missile cruiser and eight additional guided missile destroyers are planned for early construction. The guided missile cruiser, to be named the *Long Beach*, will be capable of carrying, servicing, and firing the most advanced and effective guided missiles. It

is scheduled for completion in 1960 at a cost of over 87 million dollars. The eight guided missile destroyers are of the *Forrest Sherman* class and will be equipped to launch the surface-to-air *Tartar* missile. They will also be armed with two 5-inch rapid fire guns and the latest anti-submarine weapons. *Forrest Sherman* class destroyers are 431 feet long, displace 3,370 tons, and have aluminum superstructures. —Official release.

Giant Transport Plane

The Air Force is "considering the possibility of terminating" the development of a giant transport airplane, the *C-132*. Two models of the big plane have been planned under the current developmental contract, and a wooden mockup has been completed. Designed to carry a normal payload of 50 tons and have an operational range of 3,500 miles, the *C-132* is expected to be able to take off from runways of conventional strength and length with a maximum payload of 100 tons in its immense cargo hold. Planned primarily as a cargo carrier, it could carry a light tank weighing 28 tons, and other bulky and heavy military items. The swept-wing aircraft plans to use four turbojet engines of a "new" design of 15,000-horsepower each, which give it a top speed of 460 miles an hour. The landing gear of the sky giant consists of 16 tandem wheels arranged as two coaxial quadruple wheel units in tandem on each side of the fuselage, and a dual wheel nose assembly. This arrangement provides weight distribution which permits operation on standard runways and ramps despite the enormous weights involved. The exact dimensions of the *C-132* have not been revealed, but it has approximately twice the cargo capability of the *C-133*, the largest aircraft ever to go into production (MILITARY REVIEW, Apr 1956, p 67).—News item.



Artist's concept of the *C-132*

New Fighter Bomber

Designed under the weapons system concept as a nuclear bomb-carrying fighter, and powered by a *J-75* turbojet engine, the *F-105 Thunderchief* has successfully completed more than 250 test flights. It exceeded the speed of sound on its first test flight. The swept-wing *Thunderchief* utilizes wingroot air intakes, which permit the installation of radar equipment in the needle nose, and a ventral fin on the bottom of the rear fuselage for greater lateral stability. The *F-105* is planned to be in peak quantity production in 1958.—Official release.

The *F-105 Thunderchief*

Combat Team Deactivated

The United States last airborne regimental combat team, the 508th ARCT, has been deactivated. Originally organized in 1942, the 508th received the Distinguished Unit Citation and the French *Croix de Guerre* with Palm for its participation in four campaigns in Europe in World War II.—News item.

JAPAN

State of War Ended

Japan has reached agreement with Poland and Czechoslovakia concerning the resumption of normal diplomatic relations. Both agreements provide for the ending of the state of war that has existed since the Soviet satellites declared war on Japan in 1945, and for the exchange of ambassadors; negotiations on trade and cultural matters will follow. The Soviet Union made a similar agreement with Japan several months ago.—News item.

Ship Building Lead

During the past year Japan's shipyards launched vessels of a total of 1,746,429 gross tons. This included the largest cargo ship afloat, the *Universe Leader* (MILITARY REVIEW, Nov 1956, p 76), and placed Japan ahead of all other nations of the world for shipbuilding in 1956. In second place was the Great Britain-North Ireland industry which launched 275 ships totaling 1,383,387 tons. The United States ranked ninth with 169,076 tons. Records as to the tonnage constructed in the Soviet Union are not available, but it is known that 35 vessels were built in Poland for the USSR.—News item.

CZECHOSLOVAKIA

Jet Fighter Production

The Soviet-designed *MiG-15 Fagot* jet fighters now under production by the Czechoslovak state aircraft works are being given the Czechoslovakian designations of *CS-102* and *S-103*. *MiG-15's* are being produced in Communist China also.—News item.

CANADA

New Vessels for Fleet

A newly constructed antisubmarine destroyer and two modern minesweepers have joined the Canadian Fleet. The antisubmarine destroyer, the *Saguenay*, is the fourth of her class to go into service, and will join her sister ship, the *Assiniboine* (MILITARY REVIEW, Feb 1957, p 70), in the Third Canadian Escort Squadron. The two minesweepers, the *Miramichi* and the *Cowichan*, are of the *Gaspe* class and have aluminum decks and frames. They are two of an additional six new minesweepers built to replace a similar number transferred by Canada to France under the mutual aid agreement of the North Atlantic Treaty.—News item.

GREAT BRITAIN

Helicopters for Germany

A contract has been signed for the delivery of 50 *Bristol 171 Mk.14 Sycamore* helicopters to the growing West German Air Force. Other armed forces now using this helicopter are the British Army and

***Mk.14 Sycamore* helicopter**

Air Force, the Australian Navy and Air Force, and the Belgian Air Force. The *Sycamore*, a five-place craft powered by a 550-horsepower engine, has proved itself in all types of operations to include the evacuation of about 1,500 casualties from the Malayan jungle. It has also been used for troop carrying, search and rescue, communications, and all phases of supply work.—News item.

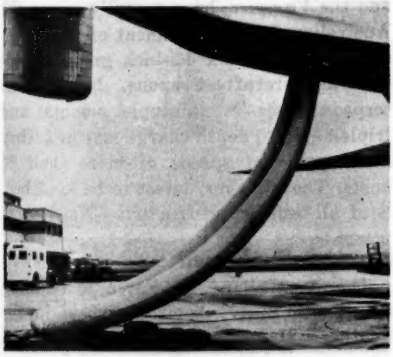
Airbases Reduced

American air facilities in the British Isles are being reduced to 10 bomber bases, 15 airfields for fighters and fighter bombers, and about 25 other types of air force facilities. This action is based on the

fact that the *B-52 Stratofortress* is capable of reaching most of its potential targets from American bases, and new United States airfields nearing completion in Spain can be used to replace or supplement the British bases as standby or recovery fields. Refueling tanker planes will continue to be based in Great Britain, but the shorter-range *B-47* jets are being phased out as the *Stratofortresses* arrive.—News item.

Escape Chute

The Royal Air Force's giant transport *Beverley*, which stands 19 feet high on its landing gear, carries an escape chute for its occupants to use in an emergency. The



Air-inflated escape chute

chute is inflatable and is anchored to the floor inside the parachute exit. It is carried deflated in the rear cargo compartment and can be blown up and ready for use in 15 seconds.—Official release.

Rapid Plotting Method

A new instrument called the *Astroplot*, designed to facilitate the rapid plotting of a ship's position, is in use by the Royal Navy. Using this system, a position with an accuracy of about two miles can be obtained from observations on six stars in about eight minutes without any calculation after the observations have been made. No parallel rulers or dividers are required for the plotting. The instrument is said to be particularly useful in training cadets and junior officers in the accurate use of the sextant.—Official release.

Atomic-Powered Ship

Great Britain's first nuclear-powered merchant vessel will be a supertanker of about 80,000 tons. It is planned to be in operation within six years. Cost of this ship is expected to be between 28 and 41 million dollars.—News item.

Most Powerful Engine

Specifically designed for optimum all-around efficiency in aircraft flying three times the speed of sound, the *Gyron D.Gy.2* supersonic turbojet engine (MILITARY REVIEW, Jan 1957, p 69) has achieved an output of 25,000 pounds of static thrust with reheat. This model of the *Gyron* has completed its first developmental stage and is currently undergoing further tests.—Commercial source.

MALAYA

British Forces Reduced

British forces stationed in Malaya will be reduced by about half after the Malayan Federation attains independence this summer. There are about 25,000 British soldiers now in Malaya. According to the Chief Minister of the Federation, the reduced forces still will be sufficient to carry on the fight against the Communists in the jungles. British aid in the training of a local Malayan Army is expected to continue.—News item.

USSR

Guided Missile Bases

According to a Tokyo newspaper, guided missile bases are being constructed on Sakhalin Island, 100 miles to the north of Hokkaido. Three bases are reported with facilities for intercontinental missiles.—News item.

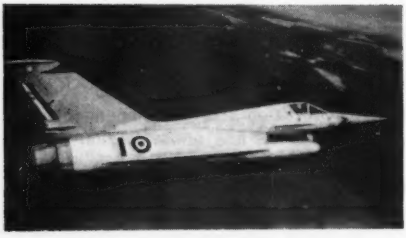
Power Network

The USSR plans to set up a vast nationwide power network of nuclear and conventional electrical power systems. The plan will unite into a single power unit hundreds of stations generating power from water, coal, peat, and shale as well as from nuclear energy. The first stage in the project will be the creation of a single power system in the European section of the Soviet Union. Hydropower stations on the Volga River will serve as a connecting link between the power systems of the central area, the south, and the Urals. Preparations are under way for the creation of a single system in Siberia; it is planned that parallel powerlines 3,600 miles long will be used to link European USSR with the central Siberian system.—News item.

FRANCE

Turbo-Ramjet Tests

The *Nord 1500 Griffon* (MILITARY REVIEW, Aug 1956, p 69) is now undergoing flight tests using an *Atar E* 7,700-pound



Griffon in test flight

thrust jet engine and a ramjet. Two prototypes of the delta-wing *Griffon* have been flown. A unique feature of this aircraft is the forward horizontal stabilizer which is used to ensure stability at all speeds.—Official release.

Helicopter Demonstrated

Alouette II, the French gas turbine engine helicopter that holds the world's altitude record, is being introduced to potential users in a tour of United States cities and military installations. The five-place, medium-range *Alouette* has a cruising speed of 110 miles an hour. The 360-horsepower *Artouste II* fixed-turbine engine which drives the rotor of the *Alouette* is said to reduce engine vibration greatly, and allow the helicopter to take off instantly after the engine is started, eliminating the warmup period a piston driven engine requires.—News item.

AUSTRALIA

Destroyers Join Fleet

Three Australian-built destroyers of the *Daring* class, the *Voyager*, the *Vendetta*, and the *Vampire*, have recently joined the Australian Fleet. Armament of these vessels consists of six 4.5-inch guns, six 40-mm antiaircraft weapons, ten 21-inch torpedo tubes in quintuple mounts, and triple-barreled depth charge mortars. They are capable of speeds of more than 30 knots. The *Voyager*, latest to be launched, is of all-welded construction.—News item.

Big Airfield Planned

The Australian Air Force is building the biggest heavy bomber airfield in the Southern Hemisphere at a cost of about 12 million dollars. The 13,000-foot-long airstrip will be ready late this year and will be able to take the heaviest United States bombers now in production.—News item.

SWEDEN

Target Aircraft Ordered

The Swedish Air Force has placed an order for 10 *Jindivik* pilotless target aircraft from Australia to be delivered in the near future. The *Jindivik* remote-controlled target aircraft is 23 feet long and has a wingspread of 19 feet. It is powered by a *Viper ASV.3* 1,640-pound thrust turbojet engine. The *Jindivik* can be remotely controlled from the ground

or from an airborne control station. It utilizes a skid for landing gear, and takes off from a tricycle trolley.—News item.

Nuclear Program

The Swedish nuclear program for the next 10 years includes 10 atomic plants for heating and power purpose.—News item.

Powerful Destroyers

Two destroyers of the *Halland* class have been built for the Swedish Fleet and two more are projected. The *Halland* is a 3,000-ton vessel propelled by geared turbines of 50,000-horsepower which give it a speed of 35 knots. It is armed with four

The destroyer, *Halland*

4.7-inch, two 57-mm, six 40-mm antiaircraft guns, and eight 21-inch torpedo tubes. It has fully automatic gun turrets and is equipped with antisubmarine weapons that can be projected forward. It has been stated that this vessel is to be equipped with guided missiles.—News item.

WEST GERMANY

Navy Receives Destroyer

The new West German Navy will receive its first major warship this year on loan from the United States. The vessel is the 2,100-ton destroyer *Anthony* which will be taken out of "mothballs" and delivered to the West German Government late in 1957. The *Anthony*, which earned a total of 10 battle stars during World War II, is 376 feet long and is capable of speeds in excess of 30 knots. Training of a German crew for the destroyer has been underway for several months. Other United States contributions to the new German Navy have been 32 minesweepers, seven auxiliary vessels, and several patrol craft.—Official release.

EAST GERMANY

Huge Airfield

A recently completed airfield in East Germany, north of Dresden, features a subterranean hangar system which is said to be capable of housing 100 fighter aircraft. Above the ground, barracks facilities have been built for about 1,000 men. The installation has its own independent power and water sources.—News item.

Agreement With USSR

An agreement between East Germany and the Soviet Union concerns the Soviet 400,000-troop garrison in the satellite nation. Information indicates that the agreement extends East German legal jurisdiction over Soviet troops for nonmilitary offenses, restricts the Russians' use of East German civilian property, and requires the USSR to keep the East Germans posted on troop movements.—News item.

AFGHANISTAN

Aviation Expansion

About 14 million dollars in American aid, including a five million-dollar loan from the Export-Import Bank, will be used in expansion of Afghanistan's civil aviation activities. A modern airport at Kandahar and six other all-weather airports are planned for construction at a cost of four million dollars. Also included in the project is the purchase of over three million dollars worth of new aircraft. The Kandahar facility will have a 12,000-foot concrete runway big enough to handle the largest long-haul turbojet aircraft.—News item.

NORWAY

Atomic Cooperation

In an agreement between the two countries for cooperation in the peacetime uses of atomic energy, the United States plans to sell Norway 500 kilograms of uranium enriched up to 20 percent in U-235. The fuel will be used in a 20-megawatt demonstration reactor now under construction in Halden in south Norway. They also will receive up to six kilograms of U-235 enriched up to 90 percent for use in a materials testing reactor.—News item.

POLAND

Repatriation Agreement

Under the terms of a new repatriation agreement between the two countries, about 500,000 persons are expected to leave the Soviet Union for Poland. The agreement permits the repatriation of persons who were Polish citizens on 17 September 1939, the day of the partition of Poland between the Soviet Union and Germany during World War II. The agreement specifies that Polish citizens in prisons or labor camps will be released "ahead of time" for repatriation, and that Polish citizens who have Russian wives can take them and their children along on the move to Poland.—News item.

Defense Forces Cut

Poland has announced that she will cut the strength of her armed forces by 44,500 men, and linked this cut with an appeal to the bigger powers to agree on disarmament. This is the third cut in Polish military strength within a year—two previous reductions totaled 97,000 men (MILITARY REVIEW, Dec 1956, p 68).—News item.

INDIA

Carrier Purchased

It has been reported that the Indian Government has purchased the 19,550-ton aircraft carrier *Hercules* from Great Britain. The *Hercules* will be refitted and modernized in the United Kingdom, and will be the first aircraft carrier in the Indian Navy. Other carriers of this class are the *Powerful*, renamed *Bonaventure*, sold to Canada (MILITARY REVIEW, Apr 1957, p 68); the *Majestic*, now called *Melbourne;* and the *Terrible*, renamed *Sydney*. Both the latter vessels are now in service with the Australian Navy.—News item.

LEBANON

Assistance Promised

The United States has agreed to supply certain equipment needed to strengthen the Lebanese armed forces. This is in addition to a recent grant of military equipment for the same purpose. Although no official information is available, it is understood that the agreement concerns two million dollars worth of arms to fill an order of long standing and for which Lebanon is prepared to pay. This action will finish equipping the Lebanese Army, which is based on one infantry division. In addition, it is reported that Lebanon will get loans of about 20 million dollars for development of highway and water projects. —News item.

PAKISTAN

Naval Vessels Acquired

The battle class destroyers, *Gabbard* and *Cadiz*, have been delivered to the Pakistan Navy by Great Britain and will be renamed the *Badr* and the *Khaibar* respectively. Two other British destroyers, the *Crispin* and the *Creole*, along with the cruiser *Diadem*, are scheduled for transfer to the growing Pakistan Fleet. The *Gabbard* and *Cadiz* were refitted and modernized in Great Britain with funds made available by the United States under the Mutual Assistance Program. The 7,560-ton *Dido* class cruiser, *Diadem*, is armed with eight 5.25-inch guns and 36 antiaircraft weapons. The 512-foot warship is capable of a speed of 32 knots.—News item.

FOREIGN MILITARY DIGESTS

The Historical Role of the Army

Translated and digested by the MILITARY REVIEW from an article by General L. M. Chassin in the "Revue de Défense Nationale" (France) October 1956.

NATIONS, as civilizations, are born, mature, decline, and die. And at each stage of the life of a nation, the ever-present army has a capital role to play. The rise and fall of nations, and the army's part in it, has invariably followed a pattern of sufficient consistency to furnish a guide, if not a rule, to the future of all civilizations including, perhaps, our own. Certainly, a rapid glance at the birth, life, and death of a few civilizations shows that the "models" of the past are strangely alike.

The principal characteristic of a nation in the stage of initial growth is the existence of a common faith among its members —faith in a dogma, a race, or a given economic and social system. A growing nation is in essence imperialistic, and seeks to impose its faith on the entire world. During this period internal convulsions, schisms, and religious wars often occur, but finally, great leaders appear, a creative minority establishes unity of doctrine, and the civilization continues on its course.

Integration by faith usually is followed by disintegration by knowledge. Faith diminishes, and reason, little by little, raises its head. Particularism appears, and the great community born from the first upsurge will be divided into states in accordance with its various races and geographical conditions. Each state will organize itself within its own frontiers and interstate wars will occur due to conflicting interests. In these fratricidal struggles, nationalities appear and little by little the ensemble loses a large part of its strength. A striking example of this can be found in the Arab world.

Within each state the "creative minority" eventually becomes a "dominating minority" which seeks to retain its power by force. With this comes an uprising of the mass of people against their masters, and increasingly greater conflicts with other civilizations. At this moment, although the civilization has lost a large part of its original impetus, it has not yet degenerated—it will attempt to react. Historically, the means it employs are always the same. It is the appearance of a "master state" which subjugates all others and becomes the incontestable lord. This unification brings about a respite which is often of considerable duration.

But faith is no longer present, and the

period of false power does not endure. If no spur to moral rearmament appears to give new faith to the peoples, signs of disintegration gradually appear. In art it is the advent of futurism and, by a curious reaction, of primitivism. In customs it is the vulgarity of the spectacles of the arena —depersonalization. A sort of tendency toward facile uniformity brings about uniformity of customs, manners of speaking, and even attempts at syncretism in religion. The illusion of an incontestable superiority over other men gives rise to dreams of universal union.

During this time, conquered minorities create and disseminate new faith, demand their freedom, and secede. Attacked from without, undermined from within, the universal state enters its death agony. However, the dissolution usually does not result in immediate death. It is always accompanied by rhythmic declines and resurgences: a decline followed by a resurrection, another decline, and another resurrection.

Rhythmic Cycle

The occurrence of this rhythmic cycle is confirmed by history. If we place the beginning of the decadence of the Roman Empire in the era of Nero (54-68 A.D.), a first upsurge can be found under Trajan and the Antonines (98-180 A.D.), a second under Diocletian (284-305 A.D.), and a final third under Theodosius (379-394).

In the case of the Byzantines, the decline dates from the death of Justinian (565) and the rhythmic recurrences were much slower. The first came under Leon the Isaurian (715-787), the next under Nicephorus Phocas and the Macedonian dynasty, and a third under the Comneni (1081-1185).

The deathblow can come from within or without. The Graeco-Roman civilization died both from inanition and the blows of the conquering barbarians, and once a nation has died, the cycle recommences.

Into this rapidly sketched picture of the life of a civilization, it is easy to introduce the role of the army.

Whatever the internal condition of a dying civilization, a blow still must be delivered the corpse. This blow is delivered either by the armed forces of a different civilization that is still in the phase of growth, or by the forces of member nations which are ready to revolt and seize the leadership.

The case of the murder of a tired civilization by a younger and more ambitious civilization is frequent. Thus the Mexicans, exhausted by the bloody sacrifices of a frightful religion of death, succumbed to the attacks of a handful of Spaniards; the Assyrians, although apparently so redoubtable, succumbed to the pressure of the Medes of Cyaxare after 150 years of uninterrupted victories; and the Byzantine Empire which succumbed to the attacks of the Turks after 800 years of meritorious resistance. The last case is illustrated by the fall of the Roman Empire.

The periods of gestation of the new civilizations often were characterized in the distant past by the appearance in the territories of the older civilizations of hordes of barbarians driven from their own domain by hunger or the impossibility of maintaining themselves there.

From the purely military point of view, these hordes generally have been just as well-armed as the forces of the civilizations they attacked, their tactics just as good, their morale superior.

The Gothic horsemen who defeated the Russian legion at Adrianople in 378 were superior to it in armament. In these cases it is virtually impossible to speak of armies. It is rather an attack by an enormous mob that we must consider, an attack that sometimes is stopped (Marius and the Cimbrians) when one is disciplined and powerful, but which presses on irresistibly when morale has disappeared.

The case of the hypothetical birth of a materialistic European civilization—the French Revolution and the Russian Revo-

lution—leads us to the same reflections. In these cases we are not dealing with "barbarians," but with military formations which are characterized by great numerical superiority, a certain amount of technical inferiority, and a very superior morale. In both cases, sustained by the people and making use of guerrilla tactics, these rebellious formations triumph.

During the period of growth and virile faith the army is an instrument of unity and conquest. It is formed by the ensemble of the nation. Wars are holy wars in which all citizens participate, sustained, as they are, by a strong spirit within. The expansion of the Arabian Empire in the seventh century, the Christian crusades from the 11th to the 13th centuries, and those of the French Revolution are undeniable examples. But the faith which stirs the conqueror is not necessarily a religious faith. The conquest of the west in the face of the opposition of the North American Indians was a conquest of growth, as were the wars of Mussolini in Africa or of Hitler in Europe.

We cannot, however, strictly speak of armies in the modern sense of the word during this first period of the life of a civilization. It is from the moment when the differentiation and organization of the nations begin that we see armies appear. Their role is easy to define.

"Fighting Kingdoms"

During what the Chinese called the period of the "Fighting Kingdoms," armies became an instrument of the defense and independence of the nations. Each of them sought to achieve its unity, to round out its domain, to install itself there, rooting out all the dangerous elements. Quickly assuming the form of permanent armies, the military forces were then composed of specialists taken from a particular caste which formed well-educated, strongly commanded, and highly trained corps. These were very costly and, therefore, employed only very advisedly.

The period of the "Fighting Kingdoms" is characterized by great progress in armament and tactics, and the perfection of a type of war which was not particularly destructive in nature. We find it, therefore, in China as well as in ancient Greece, at Byzantium, or in Europe from the 16th to the 18th centuries.

When the decline begins, that is, when a civilization has lost the greater part of its creative force, it continues to develop in the form of an empire. One of the states which composes it succeeds in subjugating all the others and in establishing a universal state. At this moment the army becomes, of necessity, a national service in which all the citizens must participate. It is an instrument of expansion, and in the main continues to be composed of citizens of the dominant military frontier. When the universal state is established, there generally follows a period of peace of greater or lesser duration during which everything will deteriorate.

No longer having any stimulant, the state loses its vigor rapidly. The citizens of the metropolis more and more look on military service not as an honor, but as a burden. They seek to avoid it as much as possible. In order to retain sufficient strength in the army, units coming from the subjugated "barbarian" nations are increasingly introduced into it.

Even if the state succeeds in retaining "metropolitan" cadres initially, it is very quickly forced to make use of indigenous forces. The chiefs of these units rapidly make their way to the superior echelons and begin to play important political roles.

After a certain length of time the army of the universal state is absolutely depersonalized. It is "barbarianized" but for a long time the "colonial" troops remain faithful and loyal, and constitute the most valuable part of the army which they enable to win numerous victories.

This situation continues as long as the army is, on the whole, sufficiently national and the national elements which make up

a part of it retain faith in their role as depositories of the life of the nation.

In its final analysis, everything then becomes a matter of education. Generally speaking, civilizations which are on the decline are incapable of reacting, although they be perfectly aware of the danger in their situation.

The Romans analyzed very well what was happening to them during the period of their decadence. They declined into the state of anarchy in full awareness of the fact. They saw the danger in their depopulation, in the evacuation of the rural areas, in the unbalanced state of their budget, in the growing popularity of the performances in the amphitheater, and in the disintegration of their power. Along with this, they perceived very clearly that their army was losing all deep military virtue.

Instead of being a national army animated by love of country and the desire to do everything to defend it, it was becoming more and more a mere aggregate composed of mercenaries bound to their chiefs by personal ties, fighting for the desire for gain, and ready to become turncoats at any time. It included an increasingly small number of Roman citizens who little by little were losing faith in their mission.

Nevertheless, as long as the "national" element—particularly the cadres—continues to be able to control the "colonials" and these have not yet attained the degree of development that impels them to demand independence, a mixed army may remain valuable and be the principal instrument of those spectacular resurgences which give an unexpected respite to the dying body.

When the civil power really disintegrates and shows itself incapable of making decisions and of effectively controlling the enemy within, one of the great roles of the army, which is to ensure order within the community itself, quickly becomes predominant. The "appeal to the soldier" is a classical reaction in all civilizations on the decline.

Saviors by the Sword

The army has shown throughout the centuries that it is not life that is of supreme value to man, but the way in which he makes use of it. Nearly all the founders of universal states and absolutely all those who have enabled their country to escape premature destruction have been soldiers.

The list of these is a long one in history, dating from the empire of the Sumerians and Akkadians founded 47 centuries ago, to the Roman Empire, which is the direct ancestor of our present civilization. One may, if he wishes, include the "universal" empire of the Incas, that of the Pharaohs, the Chinese Empire of Tsin and of Han, the Mayan Empire, the neo-Babylonian Empire of Nebuchadnezzar, the Japanese Empire created by Hideyoshi, and the Hindu Empire created by Baber. It goes without saying that all the names of the "saviors" of their respective nations that we have just cited are the names of generals, from Naram Sin to Nicephorus Phocas—the Napoleon of the ninth century.

The antimilitarists call attention to the fact that never have these "saviors by the sword" succeeded in establishing a definitive peace. How could this happen, however, without a total petrifaction? What is certain is that the "savior by the sword," supported by a solid army, has always saved his country and, sometimes, for a long time.

A Comparison

In studying the conditions of these cases of "rescue," it is extremely instructive to compare the end of the two sister empires —the Western Roman Empire and the Eastern Roman Empire.

When Constantine died in 337 A.D. the two empires were in practically the same state of decline. Approximately 100 years later the Western Empire had definitely

disappeared but the Eastern Empire lasted until 1453—1,000 years longer.

In both cases they were obliged to accept barbarians. At first grouped in special corps, they had the privilege, from the time of Caracalla, of forming a part of the legions and of acquiring even the highest grades. Soon, some became even high commanders, marrying the daughters of the emperors. They became patricians and consuls. In 395, on the death of Theodosius who had reunited the entire empire for the first time, the west was entirely in the hands of the barbarians. Honorius even married the daughter of Stilicho—a vandal.

The invasion of 406 and the sack of Rome by Alaric, followed by the invasion of the Huns in 452, sounded the final knell of an empire whose army and political power had long been in the hands of the barbarians.

While these and other lamentable events were transpiring, the Eastern Empire retained its independence. Nevertheless, it was just as menaced from without and within as the Western Empire. But the Byzantine emperors, supported by the people of Constantinople, had the courage to brutally eliminate those barbarian chiefs who wished to assume too great an importance at the court. Arcadius, the son of Theodosius, got rid of the Goths. Theodosius II, his son, avoided the influence of the barbarian generals. His successors—Martianus and Leon of Thrace, two generals—succeeded in drowning in blood the seditious attempts of the Alains.

The Byzantine emperors were able to avoid being subjugated by the barbarians because they kept the army sufficiently national in character. To be sure, they employed numerous colonial contingents. We know how Belisarius won the majority of his victories and succeeded in reconquering almost all the lost provinces of the Western Roman Empire. Approximately all of his cavalry was formed of "federated" forces—White Huns, Herulians, Arabs, Vandals, Moors, Persians, and Goths.

The greater part of his generals also were barbarians, but he had constituted a large part of his infantry of Isaurian mountaineers. The elite force which formed his personal guard of "Bucellarii" was composed, for the most part, of Illyrians and Thracians. In spite of these precautions and his very unusual qualities as a commander, this celebrated general, who was one of the greatest strategists the world has ever known, had numerous command difficulties.

That is why Leon the Isaurian—again a general who became emperor—feeling that the proportion of foreigners was becoming dangerous reestablished the balance by driving the barbarians out of the elite corps. Moreover, very prudently, the Byzantine chiefs never made use of barbarians against their own compatriots. The federated Goths served against the Persians, the Persians against the Goths, the Vandals against the Slavs, and the Huns against the Moors.

Having passed the critical point of the danger of surprise attacks at the end of the fifth century, the Byzantines endured continuing attacks from the Persians, the Arabs, the Huns, the Slavs, and the Bulgarians. But while anarchy raged within, while the religious wars, the court intrigues, and revolts seemed to announce that the death of the old empire was near, it succeeded in holding out for 1,000 years.

The underlying reason for this is to be found in the role that was played by the army. First of all, it proved itself capable of maintaining the integrity of the frontiers in spite of sometimes bloody reversals. Afterward, when anarchy within exceeded a certain level, it was a general who assumed power and reestablished order. To be sure, he very often showed that he was not well-informed with regard to political and economic matters. But always, whether it was Leon the Isaurian, Nicephorus Phocas, or Alexius Comnenus

he was able to preserve the imperiled nation.

The experience of the Byzantines may be summed up as follows: Whatever the disorder and anarchy within, all may be saved as long as there exists a solid, sufficiently national, army capable of fulfilling its two historical functions during a period of disintegration—defending the empire against external threat, and placing in control a chief capable of reestablishing order and security.

Military Control

It is quite evident that during the periods of decadence the military virtues of "courage and renunciation, faithfulness to duty, and the acceptance of sacrifice" become more and more rare—except, of course, in the case of the militant minority which is disseminating its new faith. It follows that the sole adversaries of actual effectiveness against the enemy within a nation may be in the army. Consequently, if a civilization is worthy of a reprieve, it is only the army that is capable of giving it this, for the army remains the only receptacle of the essential virtues and the sole champion of an ideal which is being increasingly assaulted.

To be sure, the military must not retain power for long. *He who uses the sword will perish by the sword.* Whatever the intelligence and wisdom of the "saviors by the sword" very few succeed in avoiding the nemesis which impels them from war to war until final catastrophe. Nevertheless, victorious soldiers who were founders or restorers of empires have existed. And they often have left behind them such a memory of peace and good fortune that their death is always mourned by the masses to whom their reigns were the fabulous "golden ages."

Only a few years ago the English general, J. F. C. Fuller, wrote:

At the present time, western civilization is once more encircled by the barbarians and, unless the nations which compose it succeed in agreeing and in solving, themselves, their problems, once more the barbarians will triumph. . . . This would require an autocracy of the Augustinian type, the establishment of a principate which should take all that there is of good in the old, and add to it the virility of the new.

Where Are We?

This leads to the posing of the final question: Just where are we along the pathway of the evolution of Christian civilization?

It is certain that we have passed the period of growth which is characterized by the creative outbursts of a common, powerful, and young faith. But after the period of growth comes that of the "Fighting Kingdoms." It seems possible to fix at the end of the crusades, in the 14th century, the end of growth and the beginnings of the second period. After nine centuries of growth, "the period of troubles" may well last an equally long time. At first sight, we appear to still be in them, since wars between "Christian" states have hardly ceased since the 14th century, and since no one power has ever been sufficiently strong to realize a "universal empire."

Our civilization follows rather closely the pattern of its model—the Graeco-Roman civilization. In the evolution of the latter, after the Greeks repulsed the formidable Persian aggression, the period of troubles began with the fatal war of the Peloponesians which marked the beginning of the decline. As Greece grew weaker a new power—Rome—was born in the west. It became the master state that united the small Hellenic communities which were incapable of uniting themselves, and brought a long and glorious life to the threatened civilization.

Applying this scheme to our civilization is it not obvious that America plays the role of Rome, and that the Balkanized nations of western Europe play, on approxi-

mately an equivalent scale, that of the Greek cities?

Here can be seen the modern counterpart of Rome taking over which may ensure our civilization at least a long period of decline and glorious resurgences.

Some individuals consider that the position of western Europe with respect to America is similar to that of the powers protected by the Roman Empire such as Egypt, Syria, Palestine, and Asia Minor, which remained for centuries practically autonomous, on the condition that they followed the line of policy laid down by the Caesars.

On this basis it could be argued that the period of the universal empire has already passed and that we have entered that of disintegration. Numerous symptoms are discernible in fact, especially in certain countries of western Europe. The presence of enemy organizations both inside and outside of the country is undeniable. The presence of a new faith which seeks to corrupt us from within is no less apparent. The criteria of futurism, of archaism, of vulgarity in art and in manners, of anarchic individualism, of paralysis of power, of regression of civic spirit, of Byzantinism in the application of increasingly complicated laws, also can be applied.

Consideration of the state of the armies of the western coalition will, perhaps, provide us with a decisive argument. It is certain that, as in Rome and Byzantium, in western Europe we have opened the gates of our formations to the outside proletariats furnished by the peoples of the empire. We have employed them practically in the same manner under the direction of chiefs belonging to the metropolis. We have sent Gurkhas or Senegalese to fight on the fronts of Europe. When the first symptoms of secession appeared, we have used the natives of certain parts of the empire for attempting to suppress revolts in other sectors. In addition, we have taught them the most efficacious points of our techniques.

But it must be noted that our western civilization constitutes a unified whole and that America who is the leader still appears to use an entirely national army.

If, then, we considered only the nations of the western end of Eurasia, one could be pessimistic (although we have nowhere arrived at the point where "barbarians" occupy high posts). If we regard the entire ensemble, we have a right to be much less disturbed.

One of the characteristics of decadent civilizations is to assist the growth of the most redoubtable of their adversaries. To go back to the Roman Empire, it was among the imperial mailed soldiers that the Rikimers, the Odoacers, and the Theodorics were trained. The decline of patriotism and the "refusal" to perform military service are rightful evils against which we must fight courageously. If we do not, we run the risk of falling like ripe fruit into the hands of our adversaries, just as Egypt and Syria fell into the hands of the Arabs, while Asia Minor, Thrace, and Illyricum continued to live independently. We may imagine, in the same way, an entirely enslaved Europe, in spite of the efforts of the Americans who could decide to withdraw back of the shelter of the oceans like the Byzantines back of the Taurus.

The conjectural aspect of these considerations can escape no one, but it has been shown that the role of the army is eternally repeated, and is always the same in the life of civilizations. Even though the factor of "tempo" cannot be determined, the direction of the evolution is easily discernible.

Summary

During the period of growth, the army plays the leading role within the nation. The political head is always a soldier. It is an element of propagation of faith,

hence of integration and of world development.

During the period of the "Fighting Kingdoms" the army's role diminishes. Within, it becomes nothing. The political power which, without contest, assumes the supreme command belongs to a civilian. Externally, the army is an element of the defense and independence of the community.

The beginning of the decline is marked by the establishment of a master empire which brings about general peace of greater or lesser duration. The army maintains order inside, and outside it protects the frontiers from the "barbarians." It is still mainly national.

During disintegration, it has two principal tasks which it will accomplish more or less well depending on the way in which it evolves: continuation of the defense of the frontiers, and resurgence of power and the assumption of control of the nation when a unanimous defensive reaction demands it.

The army will succeed in these two tasks if it is able to remain disciplined, patriotic, and national. If it loses its sense of the higher virtues which alone make life worth while, if it becomes depersonalized, denationalized, it becomes no longer a living and healthy element but a costly and unefficacious phantom. And death comes quickly. On the contrary, if it is able, under the direction of chiefs of high moral worth, to maintain its unity and its faith, it is able, for centuries, to protect the country from death by suicide or assassination.

Maintenance--Yesterday and Tomorrow

Digested by the MILITARY REVIEW from an article by Major J. A. Munro in the "Australian Army Journal" August 1956.

AN INVESTIGATION into the development of the system of maintenance is handicapped by the paucity of record. Nevertheless, even though we have few of the details, we do know of great feats of maintenance of the past.

The systems of maintenance fall into certain comparatively well-defined groups. Changes were brought about by events such as variations in the distribution of population as followed the industrial revolution, modifications to systems of government, or the introduction of new methods of transport.

When tribes merged into communities, towns replaced tribal settlements. Stocks of food, clothing, and other supplies were confined to the towns or the grazing lands immediately adjacent to them, and thus the wealth of the community remained in, or could be rapidly concentrated into, these centers. In order to traverse the voids between, armed forces had to be self-contained, for there were no means available to convey their needs to them. The first system of maintenance was thus the Self-Contained Force System.

Self-Contained Force System

Forces operating under this system carried with them their meager requirements which they replenished from captured towns. The system, of course, was easy to operate because man's needs were less, and weapons were simple and could be manufactured by the army or replaced by the simple expedient of using those captured from the enemy. In the case of many of the armies there was no such complication as uniform apparel, thus clothing also could be replaced by pillage.

Armies moved through areas in which were located towns rich in supplies so that replenishment was possible. When this was

not the case the army suffered, as in Alexander's return from India when he lost the greater part of the army and its spoils. The Carthaginian leader, Hannibal, realized that procurement was not possible at a steady rate at all times, and that there should be reserves to cover these lean periods. His army, therefore, foraged in the summer, collecting surplus supplies for the winter. From 218 B.C., for over 12 years he fought his way up and down the Roman provinces maintaining his army completely on local supplies.

The Roman legions sought mobility; maintenance was never allowed to hinder them. The Roman soldier was trained to carry heavy loads. Recruits trained with equipment 50 percent heavier than they would carry as trained soldiers. Caesar's legions actually carried 17 days' rations on the man while another 30 days were carried on the meager transport accompanying the legion.

The campaigns of Genghis Khan were all carried out with completely mounted armies having very limited requirements, great powers of endurance, and ability to live entirely off the land.

Magazine System

The system of plundering or indiscriminate appropriation led to waste and devastation of the theater of operations. As forces became more disciplined, their leaders began to regulate the appropriation, and gradually there evolved a system of centrally controlled procurement and controlled storage. Countries took regular troops into their service in place of levies, and the treasury became responsible for their upkeep. The treasury had to provide for the subsistence of the army, and could not allow it to be maintained in its own country at the expense of the people.

The method generally adopted was that supplies were collected either by purchase or by deliveries in kind from the landed estates as a form of tax, and either stored in magazines or forwarded by special wagons to areas near the troops' quarters. From here supplies were taken to the troops by means of a system of transport attached to the army itself. It became known as the Magazine System.

The first of the modern great captains, Gustavus Adolphus, systemized his supply methods by establishing magazines at strategic places and engaging commissaries to staff and maintain them. Thus he was able to reduce his accompanying baggage columns and, although they still remained large, he was able to attain rates of advance of 15 miles a day.

The waste of resources and the devastation during the Thirty Years' War convinced military administrators that a more methodical system was essential. The French were the first to inaugurate a system where requirements were drawn from magazines which were themselves not static. The system was thus one of moving magazines.

Moving Magazine System

Louvois, Louis XIV's Minister of War, formulated a system of moving magazines. He created vast storehouses along the frontier and provided them with resources to extend branches, called moving magazines, in any direction. The magazines doubled the strategic power of the French armies.

Since the campaigns of Louis XIV were almost all sieges conducted at very short distances from the frontier, Louvois limited the force to a five days' march from their last magazine. The system, when generally adopted by most other European armies, became known as the Five Days' March System.

Frederick the Great considered it safer to depend on rolling magazines, and looked upon local replenishment only as a means of making up deficiencies. He campaigned on an improved Louvois system which allowed him to go two or three more days' march from his magazines. At the siege of Olmütz in 1758 his train amounted to some 4,000 wagons.

The result was that a system which had been introduced to ensure freedom of maneuver began to produce the reverse. The sluggish unwieldy train, instead of serving the army, became a shackle, and attacks upon it or threats to it constituted one of the most important operations of the day.

Napoleon realized, long before his contemporaries, that the increase in agriculture and the development of roads in Europe would permit the easier movement and maintenance of forces in the field. He also realized that no one district could supply the requirements of a large force, hence armies should "separate in order to live and unite in order to fight." In his withdrawal in Russia it was his inability to split his force which caused his great difficulty.

With the French Revolution had come a large national army, and the government could not command sufficient means for its maintenance. The leaders of the revolution sent their soldiers into the field, keeping the war sustained by helping themselves to all they required by plunder. In actual fact, the method of the French Revolutionaries was no system. The storing of supplies did not enter into their calculations. The French thus became expert in collecting supplies, the soldiers being trained to reap standing corn and by means of portable mills to grind it into flour.

Napoleon preserved a mean between the extremes of complete self-sufficiency and absolute plunder. Authority was given to send a certain number of soldiers of each company to obtain provisions at each village or farmhouse in the neighborhood of the road by which the army marched, or of the ground on which it encamped. The soldiers were to force the inhabitants to deliver these provisions without payment or receipt.

Napoleon's plans were similar to the Roman legion. He advocated that "war be fed on war." His soldiers marching to Moscow carried 58 pounds. However, he required a baggage train of some magnitude, and on occasions this did hamper his movement. We find that in his invasion of Russia in 1812 his army advanced so swiftly that his well-stocked baggage train was unable to keep up, and even before the border of Russia was reached they were out of touch with the troops.

The herds of cattle he had gathered were straggling behind in Prussia, and the marauding which resulted was later to cost him dearly in the revenge of the antagonized Russian peasants.

His system of local replenishment also failed in this campaign because, even when large dumps of Russian supplies were captured, the army was moving forward so fast that he was unable to bring them forward at an equivalent rate. The system failed even to a greater extent on his withdrawal from Moscow.

English Colonel Sir John Jones in his *Journals and Sieges in Spain* recorded that:

The enemy during this campaign had great numerical superiority over the allies, and he would no doubt have reaped the due advantage therefrom had not every movement on the part of Lord Wellington been conducted with a happy reference to the difference of the commissariat of the two armies. The French have no magazines, they subsist by the daily contributions they levy, and never, therefore, can remain long united in a large body.

That the fault also was known by many French military leaders is exemplified in a letter which Marmont sent to Berthier on 26 February 1812. He said:

I did not find a grain of corn in the magazine, nothing anywhere but debts and a real or fictitious scarcity, the natural result of the absurd system of administration which has been adopted. Provisions for each day's consumption could only be obtained with arms in our hands. There is

a wide difference between that state and the possession of magazines which can enable an army to move.

The maintenance organization brought to a stage of reasonable efficiency in the British Army during the Peninsular War deteriorated in subsequent years. The Crimea is remembered chiefly by the public outcry at the shocking conditions which prevailed due mainly to administrative failures. The entire sorry story is one of incompetence, stupidity, and corruption. The account of the campaign is studded with examples of poor administration.

The embarkation from Varna was carried out in utter confusion. The amount of shipping provided was unable to accommodate both the army and its equipment, so tents, medicine, and animals were unloaded and left in hastily formed depots. As there was no food in the depots for the animals, most of them starved to death. Three days was the time allowed for crossing the Black Sea, but the troops who embarked first were in fact at sea for 17 days; consequently, provisions ran out and water became short.

The army was landed on the Crimean Peninsula without transport or knowledge of what was required for an army to live and move. In a short period every branch of the administration collapsed. In February 1855 the British force had 14,000 men fit for duty and 15,000 sick.

The real enemy was the lack of transport to carry supplies from the base, inadequate as it was, to the forward troops. It was only a distance of eight miles from Balaklava to the front, but no one thought of constructing a good road. A tramway was begun later, but over such a short distance a road would have been far more suitable.

From the Crimea our attention is next drawn to the other side of the world to the American Civil War of 1861-65. This struggle was unique in that it was the first time in history that the total human, financial, material, and moral resources of both belligerents were directed to the prosecution of war. It was the first "great" war. No previous war could compare with it when we consider the size of the contending armies, the number of battles fought, the extent of the country, and the duration of the struggle.

From a maintenance aspect the war was different from its European predecessors for a number of reasons. In proportion to the enormous extent of country the states were scantily populated. Settlements were few and far between, and much of the country was forest, so limiting the amount of local resources that in many areas little dependence could be placed on local procurement of subsistence for an army. Much of the country was traversed only by farm or forest tracks impassable in winter or wet weather.

It was the first war, however, in which railways began to play a vital role, but the small wood-burning engines and unballasted tracks proved quite unable to stand the strain of heavy traffic.

Another feature was the number of navigable rivers available for maintenance to the side which controlled them. A further important point was that the war came as a surprise so that no preparation had been made nor had either army any experience in provisioning large masses in the field.

Probably the major point in this first of the modern great wars was the revelation that the economic resources of a country are the real sinews of war. The South was lacking in resources, her metal supplies were few; although she had great resources of cotton there were no factories to deal with it; her wool-producing areas were to the west of the Mississippi and she had few cattle, so that leather supply for boots was completely inadequate. The South, therefore, did not have the indigenous means to maintain her forces for a long war, and could not import resources

from overseas because of the Union's control of the sea.

Eventually the Southern armies became so badly off for clothing, boots, blankets, food, and ammunition that their efficiency was seriously reduced. In the end it was their lack of the means to maintain their forces which brought about their defeat. An illustration of the deficiency of the necessaries of war is the following passage contained in a letter from General Lee to his President:

The Army is not properly equipped for an invasion of the enemy's territory. It lacks much of the material of war, is feeble in transportation, the animals being much reduced, and the men are poorly provided with clothes and in thousands of instances are destitute of shoes. What concerns me most is the fear of getting out of ammunition.

It is of interest to note that this comparatively recent war has an example of a self-contained force. It is Sherman's famous march to the sea from Atlanta. The operation was undertaken to bring the war right into the heart of the untouched South and lower civilian morale. Sherman appreciated that personal contact with hostile forces was necessary to shock the people into surrender.

As Liddell Hart has stated in his book, *Sherman*, interference with the enemy people became easier and more effective as civilization became more complex and the distribution of comfort more general.

Although immature because of the loose agrarian nature of the Southern Confederacy, these new conditions of war were appreciated and turned to advantage by Sherman. For such a purpose a force which would ravage the countryside was all the more effective, and whatever the rights or wrongs of the process from the point of view of morality, Sherman's operation had a profound effect on the will of the South to continue the war.

Industrialization resulted in a rapid increase of the European population and provided the railway as a new means of movement of supplies for armies. Armies became larger as a consequence. Clausewitz wrote of "absolute war" and his disciples designed a system whereby great masses would drive forward on a preplanned route followed by an uninterrupted river of supplies. From experience gained in Austria the Prussians in 1866-67 formulated the basis of the modern system of supply they successfully tried out in the Franco-Prussian War of 1870-71. It is known as the Ettapen, Replenishing Columns or Staging System.

The Staging System

The Prussians discarded the unwieldly train of magazines and replaced it by columns replenishing in turn from the rear. The soldier carried only three days' iron rations. The total weight he carried was 56 pounds as compared with the French who carried 75 pounds at that time. There were only four wagons in regimental transport, one for ammunition, one for medical, one for treasury, and one for officers' gear. No provisions were carried other than on the man. Five provisioning columns each of 32 wagons followed every corps. They carried three days' rations, the principle being that as soon as the wagons bearing the first day's supplies were depleted they returned to a previously located magazine for replenishment, and to bring up the fourth day's food and forage.

Ammunition was handled separately. Behind the corps there were nine columns each of 33 wagons. The columns were divided into two divisions, one replenishing from a reserve ammunition point of 264 vehicles based on the railhead usually one or two days behind the columns, while the other division effected supply. Other warlike supplies were moved by railway and sent forward of railhead when needed by special transport.

The system as envisaged by the Prus-

sians had drawbacks. It forced the attacker to stay on preplanned routes. As the working distance from the last supply point became too great for the continuously provisioning columns, a succession of bases developed in the rear. If the troops outmarched the following supply columns, local replenishment was resorted to, but because of the increase in the size of the army this source of supply, at the best, was sufficient only for about one-third of the force. Because it was found that provisioning columns could not always get forward to effect supply each evening, the system was modified by including additional vehicles to carry two days' reserves with the unit.

This, however, was the basis on which modern maintenance was established. Since the time of its introduction the conception of the lines of communication as a definite organization and formation in itself has arisen.

In the years just before World War I developments took place which had profound effects on the maintenance of forces in the field. Railways became much more efficient and numerous, and the internal combustion engine began to supplement animal transport. Both these provided increased maintenance potential and, coupled with increased industrialization and improvements in preservation of foodstuffs, allowed much larger forces to be deployed. In addition, the equipment of forces both in quantity and technicality became greater. War began to take on the characteristics of total war.

In spite of the experience of failures in maintenance as recently as the Boer War, both sides in World War I had not appreciated the lessons which were to be learned. The German system failed in the first advance. To a great extent, the destruction of the railways by the retreating Allies was the cause of the German failure, as the latter had not the means to carry out sufficient repairs to the lines.

The British system broke down in 1914, principally because the army was forced to operate on a front parallel to its communications. The handling of railways was not understood. At Amiens during the first Battle of the Somme there were 18 miles of loaded trains end to end waiting to get to the railhead. The roads foundered under the strain of extricating material from the confusion, resulting in the troops being short of every requirement.

Another fault was congestion at ports. In 1914 the British used the areas adjacent to wharves for base depot purposes, and the congestion which followed prevented speedy unloading. The condition of the base ports became an exact replica of Cape Town in 1900. The lesson learned in the Boer War had been entirely forgotten.

The stagnation of trench warfare enabled the staff to perfect a rear organization. Thousands of tons of supplies were dumped and light railways constructed to carry them right up to the front. It was an era of profusion of supply. Because of the positional warfare, maintenance was easy, but the efficiency of supply led to the false belief that the system was good for all circumstances. It is only in mobile warfare that a system of maintenance is shown in true perspective.

In the Passchendaele fighting of 1917 the enemy artillery fire was directed, in a great part, against the light railways, making it impossible for these railways to meet the maintenance requirement. When the load fell to the lot of the road transport it became obvious that the system had grave faults.

As a result, the existing transport system under which vehicles and units were specialized for particular services was modified in 1918 and a pool system under centralized control was adopted. The subsequent German offensive which was directed against vital railway centers again led to the railways becoming hopelessly congested, but the reorganized road transport this time was able to relieve the situation and, in fact, prevented a disaster.

Imperial System

Any system adopted by the British forces required the characteristic of capability of application in different conditions of terrain, and although modifications in detail might be necessary frequently, the main principles needed to be applicable under all conditions. The Imperial System was evolved which provided for base areas in which were established the ports of entry and base depots. In circumstances when it was impossible to supply railheads direct from the base depots satisfactorily, or when the lines of communication between base depots and railheads were subject to interruption, advanced bases were to be formed along the lines of communication.

Pack trains—which were trains loaded to correspond in detail as nearly as possible with demands received at base depots from formations—were to be sent forward daily from the base to railheads. The forward supply in advance of the railhead was by three links of road transport. From the railhead, third line transport carried supplies forward to refilling points, from where second line transport assumed the responsibility for forward movement to delivery points, where it was handed over to first line transport.

Just as developments preceding and during earlier conflicts affected the systems of maintenance, so did changes prior to and during the 1939-45 war. The two most important were the development of mechanization and of aircraft. These led to rapidity of movement and increased vulnerability of the lines of communication.

Fluctuation of requirements together with the vulnerability of the lines of communication required a more flexible system wherein more reserves are held forward. This holding of reserves forward, as opposed to the prewar system of retaining almost all reserves at the rear base, led to the introduction of maintenance areas established on a temporary basis. A system was evolved which, when fully implemented, adopted supply from a base through an army maintenance area to a corps maintenance area, and then to a divisional maintenance or administrative area.

The transport involved forward of an army maintenance area is, broadly: first army force transport to corps maintenance area, then second line transport to divisional administrative area, after which the responsibility lies with first line transport. The system is flexible and modifications of this broad description are relatively easily introduced.

The system did function satisfactorily in the latter stages of the last war, but conditions were conducive to a satisfactory result. There was little interference from enemy air, and the manpower position enabled the huge commitment of lines of communication troops to be met.

The vast resources of Allied production were poured into the pipeline, so that the deficiencies of the system were never revealed because the total effort was successful. The greatest fault was oversupply, as is indicated by the fact that less than half the ammunition manufactured was expended in battle.

Continental System

Parallel to the Imperial System described in the preceding paragraphs, a system known as the Continental has operated in other armies.

The essential difference between the Continental and Imperial Systems is that in the former corps has no direct responsibility in the supply system. Army establishes an army maintenance area and transports supplies forward to refilling points where divisional transport takes over. Thus there is no corps maintenance area.

When considering how maintenance should be effected in a future war we encounter the problem of the different types of conflict which may take place. The two extremes are global war with wholesale use of nuclear weapons, and the limited conflict such as Korea.

There also is the chance that a limited war could develop into a global conflict, and in such an event any concentration of installations which had been allowed to grow during the limited phase would be, to say the least, an embarrassment. Operating a maintenance system from dispersed ports and depots will not be an easy task. We should take the opportunity of getting experience of operating dispersed depots in any limited conflict, even where there is little atomic threat.

Under these new conditions of war it is important that we do not have large concentrations of supplies such as existed in base areas in World War II. This can be achieved by reducing our over-all requirements and by dispersion.

Reduction of Requirements

It is the soldier's clothing, equipment, and rations which swell the tonnages of base depots when he fights in great masses. Wherever the soldier goes, supply follows like a ponderous snake. We know that the armies of some less developed countries do not have the maintenance problem that we have because their requirements are less. Civilization has caused us to demand a high standard of comfort and resulted in us regarding as essentials what are in fact luxuries.

In any future major war, both the services and the civilian population will be called upon to exist on very much less than they do now, or did in World War II, simply because production in most countries is going to be interrupted much more than previously. In a limited conflict, where there is no interference with home production and little interference with shipping, the services can expect much the same scale of maintenance as prevailed in Korea, but in a major conflict the services must be prepared to carry on with a lot less of many of the items which we have come to regard as essential.

This reduction of standards provides a serious morale problem in the Western countries. How can we take John Jones away from his modern comforts and expect him to be an effective soldier in the new conditions under which he will live?

It is not suggested that we, too, should expect to be able to live on the proverbial "handful of rice" scale, but our forces will have to be conditioned to survive on a more austere standard than we have had in the immediate past.

To reduce the requirements of spare parts and replacements our equipment must be sturdier, even though to achieve this may mean an increase in the original cost of the items. Financial stringency in peacetime limits the development of equipment so that many possible improvements become long-range projects, but it is important in equipment design that we always bear in mind the effect of each item on the maintenance system.

We must continuously try to reduce gasoline requirements of engines, decrease weight of heavy equipment, such as bridging by use of light alloys, and critically examine the necessity of each new piece of equipment introduced into the service.

Broadly speaking, supplies in a theater consist of operating stocks and reserves, the reserves being held to cover unforeseen fluctuations in expenditure, delays in production, and transit misfortune. It would seem that the need for reserves will be greater in a future war because delays in production, atomic disasters, and disruption of shipping will be greater. Thus our over-all stocks in the theater will tend to be larger. This is at direct variance with the need to reduce the size of depots.

It is important, therefore, that we analyze the reserves we hold to determine whether the quantities are justified and that we have not slowly and insidiously developed the habit of overensuring.

A speedup in the delivery time for supplies also could lead to a reduction in holdings, because the lesser maintenance period and lower supply margin would reduce operating stocks, and we could probably accept the risk of lower reserves.

Air supply does speed up delivery time, and there is no doubt that this method will be used to a great extent in a future war. However, we should not be carried away by its possibilities as they exist at present.

The number of conventional aircraft available in the world today is comparatively small, and special types such as helicopters are rare. Examination of production figures shows that suitable types are being produced only in very limited quantities and primarily to meet peacetime needs. It is a simple economic truth that in view of commitments in other urgent projects, the Western countries at present cannot afford to finance the stockpiling of these aircraft in large numbers for purely defense purposes.

Should another war eventuate in the next few years, the number of aircraft we would like to have probably will not become available until late in the conflict.

Reorganization and changes in methods must be made as aircraft become available in quantity and type sufficient to influence the system. However, for the immediate future we must plan with the tools available and regard air supply as a limited part of the means which will be available to distribute supplies.

In addition to effecting delivery speedup by means of faster transport for supplies, speedup also can be made by decreasing the time interval from submission of demands until issue of supplies from originating depot. It is suggested that much can be done in this regard by replacing the postal dispatch of documents by a radio or teletype system.

Dispersion

The second method which will reduce concentration of supplies is dispersion. It is generally conceded that an amphibious operation of the *Overlord* type now is not feasible, since the concentration necessary to accomplish the landing will be far too vulnerable until sufficient dispersal area is taken. Even when we consider the problem in those areas where we already have sufficient ground, dispersal brings with it many other problems.

Dispersal of items such as ammunition, vehicles, gasoline, lubricants, and supplies does not present as great a problem as dispersal of ordnance supplies.

Ordnance depots at present are organized on the basis of one base depot subdivided into a number of self-contained subdepots, each holding a different class of supply. This division of the depot is *not* being designed to minimize the effects of enemy attack but is done for technical considerations. An important point is that there is only one subdepot for each class of supply, and if that subdepot is destroyed, the major stocks of that particular class are lost.

Of course, within each subdepot a degree of dispersion is obtained by splitting the stock of any one item into more than one building, but in conditions of atomic warfare it is doubtful if this dispersion is adequate.

Furthermore, it is the practice to keep the control offices intact, since it has been considered impracticable to split them without creating insuperable administrative difficulties. This fact, of course, reduces the value of what the dispersion of stocks achieves, because if the control staff is lost in an atomic attack then the issue of supplies will not be accomplished, even though they are saved.

It is important, therefore, that a revision of the ordnance depot system be made and that the conception of dispersal be changed completely in that the necessity for dispersion in the future should be based on the effects of enemy attack and not technical reasons. The system surely would be better if modified so that each subdepot holds a range of items as opposed to items of one class. It also would be preferable that the control staff be located many miles from the actual storage buildings.

Even if we agree that dispersion of base installations is necessary and practical as

far as the installations themselves are concerned, there are many other associated problems which arise. One which immediately comes to mind is the question of ports for the entry of supplies.

All ports of any size are almost certain targets in a major war and probable targets in a limited war. We must, therefore, be prepared to handle cargoes with specially provided equipment as opposed to the equipment found at existing ports. It is most likely that we will have to handle ships at a series of special anchorages as opposed to ports as we know them in peace.

It will be necessary by a method of shipping control to limit the shipping concentrated at such anchorages at any time, and also to reduce the unloading time of vessels, perhaps even restricting such operations to the hours of darkness. The supplies unloaded from ships will have to be moved quickly away from the anchorages to reduce concentration of material at such points. Because of the dispersed locations of base installations, it will not be possible to move the supplies directly to such depots, and the supplies, therefore, will need to be moved into dispersed transit areas for sorting and subsequent dispatch to appropriate depots. The transit areas should operate directly under force headquarters which would be responsible for furnishing instructions for disposal of stocks. These instructions will be in the nature of a "blanket authority," such as an order to move all ammunition received over a certain period to Depot "A" irrespective of type.

For the transit area to sort receipts completely into types, advise details of the quantities, and then await detailed distribution instructions, would not be practicable because the equipment and personnel would not permit such a degree of sorting, and it would lead to an accumulation of supplies which we wish to avoid.

Certain of these depots should be allocated the task of holding reserve stocks and slow-moving items only, and have no function in the movement of operating stocks. The advantages of such a system would be that reserve supplies remain inviolable, and the overhead of the reserve depot would be low as issues are few.

The big disadvantage is that there will be no turnover of reserve stocks. While this is serious with some items, it is not so with others such as engineer materials and ammunition, provided storage is reasonably good.

There are many other problems involved in dispersion of base depots. One of the greatest is the selection of sites for these depots and their administration. It is suggested that the depots be grouped into clusters, the siting of which again involves the problem of conflicting requirements.

First, we are required to disperse them away from communications centers and large towns which may be possible targets. Conversely, the depots require a great deal of covered accommodation and large numbers of civilian labor, both of which are available only in or near large towns. For example, a base ordnance depot serving only two divisions requires 1,370,000 square feet of covered accommodation and something like 5,000 civilian employees. It is obvious that these requirements cannot be found in an isolated area.

A number of part solutions to the accommodation problem suggest themselves. One is that packaging be developed to an extent to allow greater use of outside storage of bulk items. A simple standardized cover which can be erected by non-engineer personnel is required. This has already been done in a small way with the 21-piece galvanized shelter used in ammunition depots.

The labor problem will be relieved to some extent by the splitting of the old large base depots into smaller depots. It can be relieved further as far as clerical staff is concerned by siting the depot offices away from the storehouses in existing accommodation in towns.

Because they will realize that such installations are likely targets for atomic weapons, there may be difficulty in persuading civilians to accept employment voluntarily. Some compulsory direction of civilian labor may be necessary, and accepting responsibility for accommodation and feeding of civilian employees also may be required.

A further problem of dispersion is the administration of the personnel operating the depots. There seems no doubt that the depots must be organized to obtain less frequent deliveries of items such as rations and petroleum products than previously, and thus they, too, just as the fighting troops, will have to live on an austere scale.

There has been a tendency wherever two or more units are grouped together to set up a headquarters to coordinate and administer them. These headquarters grow into garrisons, which swell the administrative tail and disproportionately increase the maintenance load of the communications zone. It is suggested that a great many of such headquarters are not essential. It is these headquarters which have led to the growth of the communications zone into what can be regarded as a huge static entity subdivided into a number of smaller fixtures all expending a large proportion of their energies administering one another instead of maintaining the troops in the combat zone.

Forward of the communications zone are located the maintenance areas in which reserves are held temporarily on the ground, and through which pass the daily maintenance requirements of the force. The reserve stocks held are simply part of the theater reserves, which have been decentralized to meet the contingency of interruption on the lines of communication or expenditure rate exceeding delivery rate. The same considerations as apply to reduction of holdings in the communications zone also apply to the maintenance areas.

With a system of dispersion in the communications zone as suggested, and the consequent location of some of the base stocks closer to the combat zone, there is a good case for the reduction of reserves held in the combat zone itself. Furthermore, the advent of greater use of air transport for forward delivery also will justify the reduction of combat zone reserves.

Conclusion

The problem of maintenance will be difficult and the solution will count in no small measure toward ultimate success on the battlefield. In attempting to show the influence of new developments on maintenance, it is apparent in this article that many who achieved success in the military field were those who first realized how maintenance systems should be changed in the light of developments.

In our time we have in atomic warfare a development the effect of which probably will be greater than any before. Now is the time to investigate in detail the problems associated with the supply of the various types of supplies, and to design a system upon which we can rely in the new conditions of warfare.

The keystone of the logistical structure of our defense is transportation. There cannot be logistics without effective transportation; there cannot be adequate defense without logistics.

Secretary of Defense Charles E. Wilson

Peace?

Digested by the MILITARY REVIEW from a copyrighted article by Admiral Sir R. A. R. Plunkett-Ernle-Erle-Drax in "The Army Quarterly" (Great Britain) October 1956.

"HISTORY is Bunk," said Henry Ford. So he hired a ship and crossed the Atlantic to see if he could settle World War I—but he failed.

Mr. Kellogg, another Napoleon of industry, got farther. He achieved the Kellogg-Briand Pact to outlaw war which some 50 nations signed. But they had not studied history and, like most of us, had not made a careful study of those fundamental causes which drive nations to war. History does not repeat itself in detail, but it does contain records of the same blunders, repeated again and again, leading to the same regrettable results.

The tragic thing about it, however, is that those who are making the history of today never have time to study the history of the past until their own work is done and all their blunders have been made. Then, years later, they may reflect sadly on the many things they ought to have done differently.

For example, how many of our statesmen and politicians today would find time to read Admiral Richmond's masterly work, *Statesmen and Sea Power*? We need more men like him who can present in concise form a number of illustrations and point out the obvious deductions from them. A simple example is the following list of instances showing how easy it is to be in error when forecasting a period of peace.

1. Five months before the Spanish Armada sailed, Queen Elizabeth dismantled and laid up her fleet at Chatham and, when the moment for action came, the British cause was placed in jeopardy for lack of ammunition and supplies.

2. In 1698, after the Peace of Ryswick, William III's Parliament reduced the British Army to a peace footing of 7,000 men at a time when the French Army was at a strength of 180,000 men. Optimism and pacifism reigned at the festal boards of Englishmen in the Christmas of 1700, but with the New Year these sentiments received a series of rude shocks. In January 1702 the army was recalled for the War of the Spanish Succession.

3. In 1772 Lord North urged a reduction in the naval expenditure, justifying it on the same argument of "improbability." Writing to the First Lord on 5 September 1772 he said:

I do not recollect to have seen a more pacific appearance of affairs than there is at this moment. . . . This is the time, if ever there was a time, for a reasonable and judicious economy. . . . Great peace establishments will, if we do not take care, prove our ruin.

In 1774 the British reduced the number of seamen in the navy and took no serious steps to strengthen their forces in America.

War broke out early in the following year. In 1775 Burgoyne wrote from Boston:

After a fatal procrastination not only of vigorous measures but of preparations for such, we took a step as decisive as the passage of the Rubicon, and now find ourselves plunged in a most serious war without the supplies, gunpowder excepted, for carrying it on.

4. Extract from a speech in Parliament by Mr. Pitt on 17 February 1792, during a debate on Public Income and Expenditure follows:

I am not, indeed, presumptuous enough to suppose that when I name 15 years I am not naming a period in which events may arise which human foresight cannot

reach and which may baffle all our conjectures. We must not count with certainty on a continuance of our present prosperity during such an interval; but unquestionably there never was a time in the history of this country when, from the situation of Europe, we might more reasonably expect 15 years of peace, than we may at the present moment.

A year later the War of the French Revolution began and lasted, with one short interval, until 1815.

5. The great Exhibition of 1851 was pervaded by "a sense of international good will and the brotherhood of the human race," which was celebrated by the Poet Laureate in extravagant terms: "Breaking their mailed fist and armored towers."

Three years later the Crimean War broke out, and many of our regiments were still armed with the brown Bess of Waterloo days.

6. On 6 July 1870 Lord Granville received the Seals of the Foreign Office in Mr. Gladstone's first government.

The previous day, between three and four o'clock, Mr. Hammond, the experienced Under Secretary of the Department, had told him that with the exception of the trouble caused by the recent murder in Greece of Mr. Vyner and his friends by brigands, he had never during his long experience known 'so great a lull in foreign affairs,' and that he was not aware of any pressing question which Lord Granville would have to deal with immediately.

A fortnight later the Franco-German War broke out.

8. Prime Minister Asquith stated on 6 January 1910:

My knowledge of the diplomacy of Europe is, perhaps, as close and as fresh as Mr. Balfour's, and I assert unhesitatingly that . . . there is not to my knowledge a single power, be it small or great, which is shaping its policy, basing its calculations, upon the assumption that war between Great Britain and Germany is inevitable or even possible. Nor, gentlemen, can I discern in any quarter of the political horizon any cause of quarrel, direct or indirect, between us and that great and friendly nation.

The Nation, 13 December 1913, said: "Nothing more than a memory is left of the old Anglo-German antagonism."

A speech in the House of Commons by Mr. Lloyd George, then Chancellor of the Exchequer, on 23 July 1914:

The expenditure of the last few years (on our armed forces) has been very largely for the purpose of meeting what is recognized to be a temporary emergency.

It was . . . to a certain extent an emergency that disappears because of the expenditure which we incurred.

. . . the encouraging symptom which I observe is that the movement against it (spending huge sums of money on armaments) is a cosmopolitan one and an international one. Whether it will bear fruit this year or next, that I am not sure of, but I am certain that it will come.

I can see signs, distinct signs, of reaction throughout the world. Take a neighbor of ours. Our relations are very much better than they were a few years ago. There is none of that snarling which we used to see, more especially in the press of those two great, I will not say rival nations, but two great empires. The feeling is better altogether between them. They begin to realize they can cooperate for common ends, and that the points of cooperation are more numerous and more important than the points of possible controversy. All that is to the good.

Twelve days after this optimistic speech, by one of the leading members of the government, we were at war with Germany.

And so it goes on, "to the last syllable of recorded time," although we may hope that Shakespeare was perhaps feeling a

bit liverish when he added, "and all our yesterdays have lighted fools the way to dusty death."

Admiral Richmond unerringly summed up the entire situation very well when he opened his *Naval Warfare*, printed in 1930, with the following words:

Great wars are followed, not unnaturally, by reactions in thought. Men properly consider whether there be not a more rational method than war of settling their disputes. The wish becomes father to the belief that future generations will differ from their predecessors, and act rationally; so that wars will be no more.

In the presence of such a tendency of thought it seems, if not impertinent, at least a waste of effort, to make a study of war: and this same thought has occurred to students in earlier times. Jomini, writing in 1837 his Precis de l'Art de la Guerre, *said: 'It is perhaps foolish to publish a book on war at the present time, when the apostles of universal peace alone are listened to.' So, too, Sir Edward Creasy, some 14 years later, thought an apology necessary for writing about battles. 'It is an honorable characteristic of the spirit of this age that projects of violence and warfare are regarded among civilized states with gradually increasing aversion. . . . For a writer therefore of the present day to choose battle for his favorable topic would argue strange weakness or depravity of mind.' Yet four years later there was a great war with Russia: within 19 years Prussia forced the three wars of 1864, 1866, and 1870; and since then we know only too well, and the national debt testifies, that the 'increasing aversion' referred to by Creasy, and which we of today unquestionably share, has not prevented men from using the 'irrational' instead of the 'rational' method of settling disputes.*

When Richmond found, in 1939, that Germany had forced a fifth war on the unhappy people of Europe, I have no doubt that he was not greatly surprised, for he knew too well the deadly chain of cause and effect.

Some of the causes are still obscure, or anyway are little understood, but others seem to stand out pretty clearly. Of the illustrations quoted above, the first several were given to me by Lord Hankey in 1931 and were printed under the same heading, "Peace?" for private circulation in that year—about 25 years ago. On that occasion war followed eight years later. The following are deductions from them which seem justified, and entirely relevant to the present day.

Tempting Providence

First, there are a number of lessons which may be grouped under the heading of "tempting providence" or, perhaps worse, "tempting your enemies."

These arise from the ever-popular argument that expenditure on defense should be reduced because, as Lord North said in 1772, "great peace establishments will, if we do not take care, prove our ruin."

Most people insure their homes against fire, and they pay for it whatever the insurance companies tell them they have to pay. But in a modern democracy the amount paid for our insurance against war is, unfortunately, just so much as the people decide that they are willing to pay.

Thus conditions easily arise such as those shortly before 1939, when Mr. Baldwin said that if he had told the people what they really ought to spend on rearmament, he would certainly have lost the next election. This, it seems, is one of the dangers of democracy.

We should note that our political leaders nearly always feel compelled to give way to these popular demands for economy. We are accustomed to their asking from us in time of war—usually when we have been thoroughly frightened—a variety of sacrifices such as food rationing, working longer hours, or perhaps working six or seven days a week. Somehow it is

always assumed that this is to be expected automatically from the men of the fighting services, with little or no increase of pay, while their brothers at home in the munitions factories can have their wages carefully and promptly adjusted to keep pace with the inevitable rise in the cost of living.

It would no doubt be difficult to adjust this matter of "differentials"; anti raising the pay of the fighting forces to keep pace with all the pay raises given workers at home would only hasten the process of inflation from which so many evils arise. That, however, is a problem for the politicians.

Looking into history it seems at times that without knowing it we take bigger risks in peace than we do in war. Our people today live in a happy land where national health, pensions, insurance, free education, and full employment seem to make the future absolutely secure. The teeming millions in Africa, Asia, and elsewhere who are permanently hungry, sullen, and discontented seem very far away.

But to a farseeing statesman there might well come a day when he says to himself "the international situation is beginning to look very black. It is surely time to call on our people for self-denial and sacrifice in order to make sure that if things get worse, we shall have done everything possible to meet the coming storm." To have inadequate military strength in time of peace is always dangerous; to have insufficient financial or economic strength is even more so. And, due to increasing inflation caused partly by self-indulgence, that has been the British position since 1945.

The Bible says "A kingdom divided against itself shall be brought to desolation." Great Britian today is, and has been for quite a long time, "a kingdom divided against itself." It started with the preaching of class warfare many years ago by Marxian theorists, so that even today many workers look on their employers as their natural enemies. Each at times will accuse the other of being greedy and selfish, sometimes with good cause and sometimes without. But there are surely no adequate grounds for such friction or antipathy when one considers that in two world wars our people have followed cheerfully and fought gallantly under those same men who now are often their employers. No doubt in many respects there are other countries that are worse in this regard, but that is no reason to maintain ancient feuds and continue to take other risks which are definitely dangerous, as we can see clearly in certain foreign lands.

The breakup, or fragmentation, of the British Empire is a very serious matter, for the Empire, with America, forms one of the principal pillars of the Western alliance. This was pointed out in a cogent article by Sir Norman Angell in *The Sunday Times* of 15 April 1956, under the sinister title "Suicide of the West." Let us look at just one aspect of that problem, namely, the naval and airbases which maintain our lines of comunication with the rest of the Empire. These are of vital importance, and we have to remember that the strength of a chain is the strength of its weakest link.

Consider then the line of British bases which, through the Middle East and Far East, enable us to maintain contact with Australia, New Zealand, and our American allies in the Pacific. Traveling east one passes Gibraltar, Malta, Cyprus, Egypt, and the Suez Canal, Jordan, Aden, Ceylon, Singapore, and Hongkong. It is a deplorable fact that nearly every one of these is, or recently has been, threatened. We know that Spain has long been turning covetous eyes on Gibraltar. The situation in Cyprus speaks for itself.

Largely because we had not sufficient military strength to prevent it, we were turned out of Persia where, quite apart from the deplorable loss of prestige, we suffered enormous losses and lost some

millions of pounds of supplies and equipment. Much the same thing happened in the even more important Suez Canal area. Aden recently has been threatened, and it is now becoming uncertain how long we can preserve the use of our important airbases in Jordan. [The Royal Air Force has given up its airbases in Jordan since this article was written.]

Farther east we have practically been told that we must abandon all our naval and airbases in Ceylon. [The British naval base at Trincomalee and the airbase at Katunayake have been transferred to the Ceylon Government. They are likely to be available only to British forces in a future war if Ceylon is a belligerent.] There is much unrest in Singapore and it is quite uncertain how long we shall be able to maintain the complete security of our important naval base there.

Hongkong is a naval and commercial base of supreme importance, particularly since our heavy commercial losses in Shanghai. Our ability to hold Hongkong depends ultimately on whether we can keep sufficient military strength there, but it is well known that the force required to make it secure would be very large and greatly in excess of its present garrison.

The existing agreements on the Suez Canal, which have been honored for a great number of years, provide that it must be kept open for the traffic of all nations both in peace and war, but there is no certainty that these conditions will be honored in the future. [This was written before Colonel Nasser announced his intention to nationalize the Suez Canal.]

If in war we find the Canal route closed to us, our shipping must travel to Australia and the Far East via the Cape. Our naval base at Simonstown then becomes of vital importance, but here again the future is a little uncertain. If South Africa becomes an independent republic, there might well be a clamorous public demand for neutralism in the next major war. The use by us of the Simonstown base might be regarded as a danger to their neutrality and we might then be told, as we were by Ireland in the last war, that no naval bases could be used by our ships. [The base at Simonstown has been transferred to the government of the Union of South Africa.]

The More Difficult Problem

All the above remind us of a wider and even more difficult problem. Before 1939 there were various cases of flagrant aggression which the League of Nations proved powerless to stop. For example, Japan's invasion of China in 1931, Mussolini's invasion of Abyssinia, and Hitler's rape of Austria and later of Czechoslovakia. It was hardly surprising that a major disaster followed.

Everyone said how tragic it was that the League of Nations had no teeth. It was then supposed that if only the United States had joined it all would have been well. But are we very much better today? Certainly we are heaping up dangerous precedents of a similar nature.

Many people have forgotten that in the year 1946 Albania laid mines in the Corfu channel and mined two British destroyers with heavy loss of life. After the usual legal delays, in 1949 we ultimately obtained a judgment at the Hague International Court awarding us damages of over two million dollars. Of this not a single penny has been paid and no one can tell us of any means by which the payment can be enforced.

When the Persians turned us out of Abadan with major losses of capital equipment, there seemed no probability that the conpensation would be either prompt or adequate. It was one more case of successful power politics. Our means of defense were so small that, as in certain other cases, the force that had to be used by the aggressor was almost negligible.

The next step in this depressing chain of events is the curt information sent to Holland from Indonesia that the 350 millions owing to her under treaty agreements will not be paid.

In such cases the ultimate use of force can be ruled out only if it is well known that an injured nation can obtain prompt justice and full reparation without it. So we have now reached a situation where it is urgently necessary to ask—Is the United Nations capable of working effectively? If a large sum is awarded to any nation by an international court, are there any means by which that nation can make sure of being paid? Suppose, for example, Holland went to the Hague Court and was awarded a payment from Indonesia of 840 million dollars. By what means is it possible to ensure that the money will be paid?

If these questions cannot be answered satisfactorily, as at present they cannot, how can we rule out the possible use of force?

Conclusion

The above considerations show how difficult it is for us to consider disarmament or any extensive reduction in our national service, because all our armaments must be based on the scale of our commitments and the particular dangers that threaten us.

Also, it seems that we are making the ancient blunder of tempting our enemies, because our military, financial, and economic strengths are, quite definitely, not so great as they might be. The situation is much less secure than most of our people think it is. One can only hope they will be ready to respond to an urgent call if the government, at some later date, thinks it necessary to make one. And if they are unwilling to do so, one can only say: *You have been warned.*

Admittedly, today we have the hydrogen bomb, which among all sane and responsible men should be a powerful deterrent to war, but it is no certain protection against the folly and blunders of mankind. We all remember the ancient story of the lunatic looking over the asylum wall and calling to the passers-by, "Please give me a piece of toast." Being asked, "Why? What for?" he replied, "I am a poached egg and I want to sit down." It seems possible that a lunatic of today might be heard calling out, "Give me a hydrogen bomb, I want to sit on it. Then I know I shall be safe, for no one would ever dream of exploding it."

That indeed is almost the basis for such security as the Western Nations enjoy today. Let us hope that their optimism will never be disappointed.

The problems affecting world peace are many and varied, and are not easy to discuss. They are naturally the most important issues of the day in many nations. The greatest and the most humble devote lifetimes of work to their study. But it is only in a free nation that national security is the concern of each and every one of its citizens.

Admiral Arthur Radford

In Aid of the Civil Power

Digested by the MILITARY REVIEW from a copyrighted article by Captain J. N. Elderkin in "The Royal Engineers Journal" (Great Britain) December 1956.

IN DECEMBER 1954 few people in England knew much about *Enosis*. In Cyprus there had been murmurings and slogans but no terrorism of any kind. The Greek Government was trying to persuade the United Nations to discuss the Cyprus "problem," but outwardly it had no effect on the daily lives of the people on the island; both Greeks and Turks were always friendly. The government was, however, well aware that trouble might come suddenly and plans had been made accordingly. Garrisons on the island had their internal security assignments, and drills for emergencies had been worked out.

In the Limassol district one squadron had been earmarked for duty in the town and it had been agreed that it would move to the hospital grounds should the commissioner consider it necessary. This area was chosen as being the closest to likely trouble spots. It also was arranged that an officer with a radio set would join the police superintendent and the commissioner in the main police station.

Limassol is a thriving town of narrow streets and low two-story buildings. It has no real center and no open spaces. A crowd could fade away through front doors and re-form in the next street at the back. About one-sixth of its 60,000 inhabitants are Turkish. At the time of this incident, service families were in lodgings spread evenly over most of the town.

During December a certain amount of training was carried out, and officers familiarized themselves with keypoints in the town and explored routes through the maze of streets. Warning banners were made up inscribed in Greek, Turkish, and English, calling on crowds to disperse or risk being fired on. Portable barricades and concertina wire also were produced.

The UN refusal to discuss Cyprus was made known on 17 December and island leaders called for a general strike on the following day. The Limassol commissioner felt there was no real likelihood of trouble occurring and no special steps were taken beyond issuing warning orders to the commanders of the two troops available.

18 December

At 0920 the commissioner reported that several large parties of students were assembling and asked for the local security scheme to be put into operation. The Limassol squadron was, therefore, placed at immediate readiness and at 1100 the squadron commander was told to move with his squadron to the hospital. About 80 men were moved in from the camp without incident. The radio net was opened and communications, although hampered by buildings, were tolerable all day. At about the same time the commander moved to the police station, and the remaining two field squadrons were alerted.

The hospital was surrounded by a low brick wall topped with iron railings and nowhere was the wall more than 30 yards from the building. Inside the enclosure, trees and outbuildings gave a certain amount of cover and the vehicles were parked well clear of the entrance. An officer was sent to the main square to find out what was happening. He reported that someone was addressing quite a large crowd, but that there was no sign of rowdiness. It was now about 1145.

1200

A crowd of 50 to 60 people had assembled outside the hospital. It was made up of cheerful friendly looking Cypriotes and inquisitive children. From the square

came occasional shouts of, *EEE-NOSIS.*

1245

A report was received that a British-owned bar not far from the hospital had been broken into by a mob. The squadron commander reported that he considered the police should act to disperse the crowd outside the hospital without further delay.

1310

Police addressed the crowd, but they refused to move. They were reported to say they would stay as long as the troops.

1330

The crowd was now about 300 strong and was calling for the British flag on the hospital to be lowered. The numbers were still increasing, and at this stage a portable barricade was placed across the entrance to the compound and the soldiers concerned were the target for the first stones. The police again addressed the crowd with a loudspeaker, but to no avail, and the intensity of the stoning increased. The squadron and its vehicles were showered with missiles, some of them rocks weighing three or four pounds. Vehicle windshields were shattered and canopies torn. Some soldiers were struck, but none seriously.

1400

The commissioner sent his striking force of two police riot squads to the hospital. One was armed with rifles, the other with batons and shields. They had a small number of tear gas bombs with them. Their success was immediate, and using the tear gas they drove the crowd away from the hospital and established cordons at nearby street intersections.

1415

By this time the crowds had regrouped and were stoning the police cordons. The squadron was deployed with one troop to the rear of the hospital and one to the front, both being readily available as striking forces. At the command post in the police station it was clear to the commissioner and the commander that the situation was deteriorating and at about 1425 the command party reached the hospital. When they arrived the armed police parties at two of the barriers had the crowds under control. But at the third roadblock the situation looked rather ugly. The crowd was very large and extended into the roads radiating from the intersection. It was estimated that 500 people were visible. The 20 policemen, equipped only with clubs and shields, were being stoned continuously.

A few minutes after he arrived the commissioner asked the superintendent of police to reinforce the police at the threatened position with riflemen. However, before this could be carried out the police started to withdraw from this roadblock. The movement began in an orderly way, but ended in disorder. The mob, stoning heavily, followed at about 50 yards' range. The police fell back to the hospital gateway where both they and the squadron area were again in range of the rioters.

At this point the commissioner formally requested the troop commander to take over the situation; the request was verbal and confirmed shortly afterward in writing. The time was 1440.

The commander considered that the crowd could be dispersed only by fire. A banner was unfurled across the road and the crowd to the north was warned by the police superintendent that fire would be opened on them if they did not disperse. They were then massed in the road about 50 yards from the hospital entrance. An NCO and three selected soldiers were formed beneath the banner; magazines were charged, but the rifles were not cocked. The NCO was then ordered to load and fire, but the round obviously was wild and went over the heads of the crowd without producing any noticeable reaction. The first soldier then was given

a similar order and this time, although no one in the crowd was seen to fall, the mob withdrew some yards and thinned. Stones were falling around the small party under the banner, and all were suffering from the effects of tear gas, since they had removed their masks in order to see more clearly.

At this stage the commander decided a further round was necessary and the NCO was ordered to fire at a man in the front of the crowd who, besides wearing a distinctive shirt, also was an active and accurate stone thrower. He fell. Almost magically the crowd scattered. Four of the mob carried the wounded man to the hospital entrance and troops assisted them to the casualty station.

The street now was almost clear. Soldiers were formed up in line abreast, and with fixed bayonets moved down the main road and the lane on the north side of the hospital. Side alleys were picketed and after reaching the crossroads attention was turned to the small square to the east. Here, a pillar of smoke, seen earlier, turned out to be coming from a bus which the rioters had overturned and burned. The area had to be physically cleared and since no police were available the troops carried out the task; inevitably they came into close contact with the crowd and *the sight of their fixed bayonets had a very sobering effect.* Cordons finally were established at the same points as before.

By about 1515 crowds had collected in front of all the cordons, and although there was no stone throwing, they would not disperse. Any gap between the troops and the crowd was only preserved with the greatest difficulty. At 1530 a second squadron arrived on foot and gave assistance by thickening the cordons and providing a reserve.

1615

The mayor of Limassol (a Communist) and other leading citizens arrived at a cordon by car and asked to speak to the commissioner. The troop commander marched the mayor up the street. The commissioner allowed the party to address the crowd over the police loudspeakers, and they made every effort to persuade the people to go home. Some of the older people seemed to take the advice, but it had no effect on the youths and children.

1720

Dusk was falling and the commissioner and the commander agreed that the troops should withdraw to the outskirts of the town. The crowds were told that the troops were leaving, but must not be followed. Soldiers from the first squadron were rapidly marched back to their vehicles in the compound, and the second squadron marched out of the town in close order. The vehicles drove away under a shower of stones and the police who came behind them had a very hot time. In some ways the situation looked almost as bad as it had four hours earlier, but the continuing provocation did not develop. When the commissioner got back to the police station he agreed that the police should resume control, while the troops remained in readiness.

Later on in the evening the police dealt energetically with groups of rioters roaming the town, but apart from broken windows in a British-owned hotel no serious damage was done. A heavy downpour finally cleared the streets at about 2100—to the considerable relief of the civil and military authorities.

Retrospect

Outbreaks of rioting occurred in other towns on the island the same day and it became apparent later that the disturbances were far from spontaneous. A mobile police column in Nicosia originally was intended to assist outlying towns, but was never allowed to leave the capital. Agitators in Limassol seized on the presence of

the army as a suitable focus and built up the riot against it.

Police investigations later revealed that a mobile wing on bicycles had been used to explore the flanks of army and police action and enabled the movements of the crowds to be effectively coordinated. There also had been an organized supply of stones to the rear of the crowd. The three shots fired caused three casualties; two were attributed to the second shot. No one died.

Troops in the Limassol area were not again allowed to become passive targets, and were later freed from the necessity of waiting for control to be formally handed to them before taking preventive action. As a result no major disturbance took place in Limassol during the next nine months; when one did occur, the same squadron was brought in quickly from the outskirts of the town and was able to clear the streets by vigorous action without resorting to firing.

Conclusions

It is always much easier to be wise after an event, and although some of the points made may be fundamental they bear repetition.

1. Once a situation has been allowed to develop in such a way as to make firing inevitable, a single round fired at a ringleader does all that has ever been claimed for it. The fire order must be explicit and the shot aimed to kill.

2. Nowadays a spontaneous riot is a very rare thing. The opposition must be credited with making deductions as to probable police and military action. The riot usually is organized around a hard core trained for the purpose and it is against them that action must be directed. If they can be broken up, the passive crowd, however large, can be ignored.

3. Troops must never be allowed to stand about and become passive targets, and vehicles should be kept away from the scene of any disturbance.

4. A crowd is very sensitive to being surrounded, even when troops are thin on the ground; in a closely built-up area the aim should be to envelop the crowd and restrict its movement. Troops should not be inserted into a crowd.

5. If it is necessary to cordon a street, there must be a physical barrier between the troops and the crowd. Concertina wire is ideal and should be combined with some form of "do not cross" sign. Training manuals recognize the psychological value of fixed bayonets when troops have to be used to clear crowds, but in training the importance of avoiding close contact with crowds is stressed to such an extent that the contingency is never prepared for; this is a serious mistake because it often will be unavoidable.

6. Preparations for internal security action must include an ample number of warning signs and banners; any detachment which may have to fire can well use six or eight of these. Vehicles should carry protection for windshields.

7. Whenever civil disturbance is imminent and troops are alerted, liaison between civil and military authorities must be such that troops are used in good time, given a clear task, and then withdrawn as soon as it is accomplished. In the circumstances described, the most difficult decision was when and how the troops should be disengaged. It must depend, of course, on the police strength and morale, but the longer the delay the harder it becomes.

Atomic War and Partisans

Translated and digested by the MILITARY REVIEW from an "article by a former Soviet-Russian officer" in "Deutsche Soldaten-Zeitung" (Germany) November 1956.

THE atomic weapons and their possible employment have given rise to a regrouping of military forces and an adaptative change in equipment, organization, and tactics of army units throughout the entire world. In many quarters the idea has arisen that the former organization of an army is obsolete, if not altogether unusable. The effort is being made—at least in responsible and professionally schooled circles—to achieve a discreet balance between atomic possibilities and military realities.

Korea, Indochina, Suez, and the abortive uprisings in some of the Soviet satellites have proved very well that there will be situations today, and certainly tomorrow, in which no application will be found for the atom bomb.

On top of this fact, partisan warfare has come more and more to the forefront. It can be maintained with certainty today that in a military clash of major proportions, partisan action would play a far greater role than it did in World War II.

Germany had her adherents in the European countries against whom she fought in World War II. At the same time that German emigrants were supporting the cause of the Allies, the Norwegians, Danes, Dutch, Walloons, Flemings, Ukrainians, Caucasians, Cossacks, Estonians, Latvians and Lithuanians, and even Swedes and Swiss hastened to the German colors. Even some French fought in the German Army although, at the same time, French in the ranks of the *maquis* carried on a bitter war against Germany.

If the cold war were to give way to a hot war, the situation would be no different. In the satellite countries men wait impatiently to take up arms against the Soviet Union and her slaveholders. The actual political situation of today completely confirms this idea. Wherever the USSR experiments with her camouflage of democratization, the masses are attempting to throw off the hated yoke.

On the other hand, in France and Italy, for example, there are strong Communist Parties who are preparing themselves for zero hour, as is shown particularly by the ever-recurring discoveries of Communist weapons caches in Italy. In the event of a conflict they would fight, weapons in hand, on the side of the Communist Russians against their own fatherland and freedom.

It must be assumed, therefore, that in the event of the outbreak of a new world conflict, strong partisan movements will occur on both sides, and that at least the East has long since recognized this possibility and prepared itself accordingly.

Certain elements of the population for various reasons very quickly will join these partisans on both sides. When the American troops landed in France in June 1944, the number of the certified members of the French resistance movement was hardly more than a few thousand. As P. Taittinger relates in his book, *Et Paris Ne Fut Pas Detruit*, this number, which had risen to 100,000 two weeks later, exceeded all expectations.

The Chinese also are masters of partisan warfare. Mao Tse-tung says in his book, *The Strategy of Partisan Warfare*:

Without centralized strategic command, the partisans can inflict little damage on their adversaries, as without this, they soon break down into roaming, armed bands, and then, also find no more support by the population.

The well-known Soviet partisan chiefs, Kovpak and Federov, came to exactly the same conclusion. They state in their mem-

oirs, furthermore, that one of the most important conditions for the success of partisan combat is regular and timely supply of arms, ammunition, and medical supplies.

It is absolutely grotesque that partisan tactics, which are among the oldest methods of combat on earth, should develop into one of the most dangerous instruments of warfare only as a result of the development of technique. Formerly the small, dispersed, and wholly independently operating partisan units were completely isolated and very easily became prey to discouragement. Only with the development of aviation and the radio communications by which the command headquarters could remain in constant contact with even the smallest partisan group was the psychological danger averted and the combat morale of the partisans raised. At the same time, the engagement of the small groups was harmoniously fitted into the operation thus creating new, and heretofore nonexistent, possibilities for the harassment or annihilation of the adversary.

In World War II partisan activity at times and in a few sectors shifted the center of gravity of the fighting from the main line of defense into the hinterland. Croatia and Serbia, the operational areas of the partisan leader, Tito, who was as daring as he was successful, are proof of this.

The value of these units on the Eastern Front also may be measured on the basis of the increasing supply by air of the Soviet partisan units. While in January 1944, in the central sector, the Soviet planes carried out 217 flights back of the German front for the partisans, this figure rose to 917 in March, and in May to 922 flights.

Atomic Weapons

One of the successful tactics in partisan operations is their continual change of position. Mao Tse-tung declares that the partisan units must change their position automatically, since only in this way can they mislead and surprise the enemy.

It is self-evident that with such tactics the employment of artillery and tanks is impracticable. Aside from the fact that partisans usually operate in trackless terrain, it is in the nature of partisan action not to concentrate but always to operate in small banks.

From this it is apparent that if the military technique of World War II was unsuccessful against the partisans, the employment of the most modern military technique also would be entirely useless. The fact that the present-day nuclear bombs would destroy great areas does not justify the employment of this excessively costly weapon against dispersed partisan forces. No government is in the position to squander so much capital, and the success obtained would be most problematical.

In the modern partisan warfare in Korea, Indochina, and Algeria, even the employment of modern aviation with napalm bombs has not played an important role. The British colonial officer, Captain R. E. R. Robinson, confirms this in his book, *Reflections of a Company Commander in Malaya*, when he reiterates: "The employment of atom bombs against partisans may as well be forgotten!"

There is no way to protect one's own operations from the threat posed by partisans, other than by the employment of partisan tactics. The German High Command finally arrived at this conclusion on the basis of a great deal of experience in the combat of partisans. Only when the Germans abandoned their oppressive tactics against the people on the Eastern Front and recruited volunteer aid from the eastern populations were they able to eliminate the partisan menace. It is interesting to note here that the German troop command, notwithstanding orders to the contrary from higher up, seized the initiative as the result of its own experiences.

As early as 1941 there were tens of

thousands of Russian deserters and volunteers, especially from the Ukraine, in the German Army. Because of their precise knowledge of the terrain and the population, these deserters helped in the elimination of the menace in the rear.

By the fall of 1942 more than 47,000 former Soviet prisoners and inhabitants were watching over the rear area of the Eighteenth German Army which lay before Leningrad. Out of these first anti-partisan detachments was formed an army, under General Wlassow, of over a million men made up of the most varied peoples of the Soviet Union.

It was not the fault of this volunteer army that it did not achieve full effectiveness. The mistakes of the German Command during the winter of 1941 and the oppressive practices of the German civil administration combined to assist the Bolshevist partisans.

Pursuit Commandos

In spite of this, however, the Germans succeeded, with the help of partisan detachments, in cleaning the Russian partisans out of large areas and in securing supplies of food, ammunition, and men. In order to beat the partisans by their own methods, in August 1942 the command of the Northern Army Group issued an order for the organization of pursuit commandos, an example which was very quickly followed in other sectors. The pursuit commandos were small units made up of selected Germans and native inhabitants of the area in question. They were specially trained for partisan combat and learned the methods of cunning and surprise exactly as did their adversaries. Their armament was light weapons. In the winter they traveled on skis as well as in horse-drawn sleighs.

In May 1944 the Germans issued very precise instructions to all arms of the service on how the fight against partisans was to be conducted.

These instructions stated that troops who fight against partisans should be armed only with such weapons as they themselves can carry (machine pistols, light machineguns, mortars); the need of the employment of cavalry and the use of aviation for reconnaissance also was stressed.

The Germans had learned with the passage of time, even if very slowly.

Partisans are best able to operate in wooded, expansive terrains, in jungles, and tundras. A region that is not open from the standpoint of vehicular traffic presents a good condition for effective action on their part. Since west European terrain is comparatively open, the Germans lacked the experience for rightly evaluating the partisan action. Here the Russian had a lead from the very start. Indeed, the activity of the anti-German partisans in France, Holland, and Italy showed that terrain plays a very important, but by no means decisive, role in partisan activities.

The Germans found themselves in about the same situation as the United Nations troops years later in Korea. They had permitted an important factor to escape them. They had not considered it, hence had issued no instructions.

It was plain to be seen that in areas that had been occupied at the beginning of the war, the partisan movements developed with difficulty and to a lesser degree; while in other areas, which did not fall into German hands until later, they soon blossomed forth to an unbelievable strength.

The explanation of this is very simple. The development of military operations gave the Soviet Command sufficient time to prepare the partisan action, establish ammunition dumps, construct food-supply depots, build shelters, establish a radio network, discover or arrange dropping areas for supply by air, and, perhaps most important, select and train leaders, agents, and spies for the partisan movement. Partisan war, like other forms of combat,

requires time for mobilization and deployment. The German officialdom believed that the partisan activity was only a reaction to the bungling and pernicious practices of the civil administrators in the eastern areas. This was a fundamental error.

Korea

In Korea the United Nations troops successfully employed the instructions for the combat of partisans that the German OKW issued on 6 May 1944 as the basis for their combat of the North Korean and Chinese partisans. In this area the United Nations troops faced exactly the same difficulties as the Germans in Russia.

In November 1950 they had to assign four of their 10 divisions to the combat of partisans in their rear areas. The chief of the Chinese-North Korean partisans, Teng-teh-Huai, operated so successfully in spite of this that the number of soldiers who fell at this time in the combat of the partisans reached the same height as the losses on the front.

The overwhelming majority of the missing were treacherously murdered by the partisans or taken prisoner. Not until the South Korean units were assigned the task of combating the partisans was every partisan activity effectively halted; by the summer of 1951, however, it was no longer a serious menace.

From a careful study of the partisan problem, therefore, the fact must be recognized that from the purely military standpoint, the partisan menace has in no way lost its significance as a result of the atom bomb—quite the contrary! While massed troop formations in the future will be exposed to atomic annihilation, the partisans will escape this most terrible and dangerous weapon of war.

The developments of modern military technique in the domains of aviation and signal communication are of aid to the partisans, but are almost of no use in combating them.

Partisans cannot operate, however, when their supply bases are exposed to enemy action.

This last fact, especially, explains why the anti-Soviet partisans who were active from 1944 to 1949 in the Baltic region, Lithuania, Poland, West Ukrainia, and southern Russia could not operate effectively. After the movement had grown to a few hundred thousand, it was beaten and in part wiped out by Soviet formations, because supply bases and a centralized high command were lacking to these anti-Soviet partisans.

The Future

It can only be hoped that the Western General Staffs will today, in foresighted preparation, perform the same work that the Soviet General Staff did in express tempo in 1941 and 1942 under the pressure of the German advance.

Certainly western Europe—in contrast with the Balkans and eastern Europe, as well as Asia—from the purely geographic point of view, is in a much more difficult situation with respect to partisan warfare. However, it is a mistake to believe that the population of western Europe would not be capable of defending itself if it really came to a matter of life and freedom.

The suggestion that the German Command was unsuccessful in 1944-45 in creating a strong partisan movement in the areas occupied by the Allies is a weak argument. At that time the German partisans could no longer look forward to receiving supplies since the German Command was often quite unable to supply the German fighting front and the German Luftwaffe was practically out of the picture.

It was Clausewitz who said: "Partisan warfare, however, evokes in people strength which, under other circumstances would never have asserted itself." His words have not lost their force even today in the shadow of the atom bomb, the rocket, and the jet squadron.

BOOKS OF INTEREST TO THE MILITARY READER

NO MORE COMRADES. By Andor Heller. 175 Pages. Henry Regnery Co., Chicago, Ill. $3.50.

BY LT COL FRANK E. BURDELL, JR., *Inf*

With the mission "to use every means possible to tell the people of the world the truth about the Hungarian Freedom Revolution," the author departed Hungary at the end of the eight days of fighting which won a cherished, but temporary, freedom.

Mr. Heller, a photographer on the staff of the official Hungarian news agency, proceeds to carry out his mission in four concise, readable chapters, documented with many graphic photographs. He describes in clear, simple style his observations during that historic period in October 1956 and then lucidly relates the conditions which brought about this struggle. His final chapter, "Victory Postponed," tells briefly of the offensive which destroyed four days of independence. "At dawn on November 4, 1956, Soviet Russia attacked Hungary with 6,000 tanks, thousands of guns and armored cars, squadrons of light bombers, 200,000 soldiers—and a tidal wave of lies."

Early in his book, Mr. Heller lists the 14 (later 16) student demands on the government ranging from "Withdrawal of Soviet troops from Hungary" to "Destruction of the giant statue of Stalin" and covering an assortment of economic, political, and governmental grievances.

The thoughtful reader may well reflect on the accuracy with which these events are portrayed. The author may be excused a certain lack of objectivity which is inescapable in attempting to report incidents which transpired amid such tensions, excitement, chaos, and probably danger. However, Mr. Heller manages to convey a deep sense of sincerity and forthrightness despite the fact that his experiences and observations are undoubtedly colored by personal emotions.

VISION. A Saga of the Sky. By Harold Mansfield. 389 Pages. Duell, Sloan & Pearce, New York. $5.00.

BY LT COL CHARLES E. LAMONT, *Inf*

This book is concerned primarily with the origin and development of the Boeing Aircraft Company from the pre-World War I days to the present.

The author prints a vivid picture of the stresses upon management and engineering and production staffs when dealing with the problems inherent in selling principally to one customer—the Government.

Mr. Mansfield does a fine job in setting out history of some of the most famous aircraft built—the *B-17 Flying Fortress*, the *B-29 Superfortress*, and the jet *B-47*. This book has a place in the background reading of the professional military man since it shows clearly how industry, particularly the aircraft industry, is intermeshed into the defense structure. The reader also will be intrigued with the byplay brought out concerning Air Force personalities who became as well known as the aircraft mentioned.

TOTALITARIAN DICTATORSHIP AND AUTOCRACY. By Carl J. Friedrich and Zbigniew K. Brzezinski. 346 Pages. Harvard University Press, Cambridge, Mass. $4.25.

BY LT COL HOWARD L. FELCHLIN, *Inf*

The basic purpose of this scholarly book is to delineate the general nature of totalitarian dictatorship and the type of society which it has created. To this end the historical experiences of Italy, Germany, the satellite countries, and the Soviet Union in particular have been profitably utilized.

While the authors have covered a considerable amount of familiar ground, they have established and carefully analyzed one vital point—despite individual differences, all totalitarian regimes have a common discernible pattern which consists of six interrelated components. They are: an official ideology, a single mass party, a terroristic police, a monopoly of all means of mass communication, a monopoly of weapons, and a centrally planned and controlled economy.

The authors frankly are pessimistic and contend that it is most likely that totalitarian dictatorships will continue to become more total even though the rate of intensification may slow down. In spite of the recent developments in Hungary and Poland, they believe also that it is extremely doubtful that Communist totalitarianism can be overthrown by external war. Can one accept this viewpoint without reservation? Will the possibility of open war increase as the Communists gain in military preponderance and their internal difficulties subside? These questions invite thought and consideration.

THE POLITICS OF THE PRUSSIAN ARMY 1640-1945. By Gordon A. Craig. 536 Pages. Oxford University Press, New York. $11.50.

VERLORENE SIEGE. By Field Marshal Erich von Manstein. 664 Pages. Athenäum-Verlag, Bonn, Germany.

BY LT COL W. C. MAGATHAN, JR., *Arty*

Verlorene Siege (Lost Victories), published in the German language, is unquestionably the most important book on World War II from the German side which has yet appeared. It constitutes the testament of the man whom Liddell Hart called:

. . . the ablest of all the German generals, the Allies most formidable military opponent—a man who combined modern ideas of mobility with a classical sense of maneuver, a mastery of technical detail, and great driving power.

From the Western point of view, Von Manstein's thorough discussion of the evolution of the plan for defeating the Allies in 1940 is most important. The original orders of the Army High Command for the campaign and Von Manstein's counterproposal and estimate are published for the first time.

Of particular interest to students of Hitler is a lengthy discussion of his strengths and (fatal) weaknesses as a commander.

The book will prove to be a valuable contribution to the literature of strategy and a first-rank source of material for historians.

THE OFFICER'S GUIDE. Twenty-third Edition. 505 Pages. The Military Service Publishing Co., Harrisburg, Pa. $5.00.

BY LT COL ROBERT M. WALKER, *Arty*

This is the 23d edition of an encyclopedia for Army officers, their wives and families, and is an authoritative and up-to-date guide to the Army and its ways. While it will be of especial interest to newly appointed officers, it represents a unique compilation of factual data which will be invaluable to all officers, regardless of grade or experience.

INTERNATIONAL LAW FOR SEAGOING OFFICERS. By Commander Burdick H. Brittin, United States Navy. 256 Pages. United States Naval Institute, Annapolis, Md.

BY CAPT E. M. STEVER, *USN*

From the title one would conclude that this book contains little of interest to any member of our Armed Forces not wearing a sailor suit. Admittedly, the book was originally conceived as a text for midshipmen at the Naval Academy and later expanded to meet the needs of young officers on sea duty. However, apart from the obviously naval chapters on territorial waters, the high seas, ships, and war at sea, Commander Brittin has included much general information of value to any officer regardless of branch or service.

Historically, the Navy has always been vitally interested in the subject of international law as a matter of necessity. Immediately before, during, and immediately after World War II, international law as a source of practical guidance went into eclipse. Now, however, interest in international law is on the rise; it is no longer a subject of primary or exclusive interest to the Navy. The Army, in particular, with large numbers of troops deployed in foreign countries is now faced with countless daily problems which require officers at all levels to have some knowledge of the sources and deficiencies of international law.

The appendices include the texts of various new international law sources such as the Geneva Conventions, the US-Japan Security Treaty, Charter of the United Nations, the NATO status of forces agreement, and others.

This book will not make an international lawyer out of the reader but it will give him a fairly painless appreciation of the scope and problems of international law in our modern world.

THE ECONOMIC FACTORS IN THE GROWTH OF RUSSIA. By Nicholas L. Fr.-Chirovsky. 178 Pages. The Philosophical Library, Inc., New York. $3.75.

BY MAJ ROBERT H. ALLAN, JR., *CE*

This is a book that should be read, studied, understood, and reflected upon by every officer in the collective military forces of the non-Communist world. In addition, this most scholarly treatise deserves the close attention of every civilian official charged in any way with the political direction of Western defense.

Every page of this economic-historical analysis of the basic Russian imperialistic drive to dominate the world since the 12th century is charged with startling and basic truths. The understanding of these truths is essential if mistaken political moves on the part of the Western Powers are to be avoided.

Mr. Fr.-Chirovsky, who is Associate Professor of Economics at Seton Hall University, attacks his problem of proving this basic Russian imperialistic drive in three steps. In the first part of his book he discusses the economic factors which have contributed, down through history, to the development of the Russian national psychology.

In the second step of the discussion, the economic factors which impelled territorial expansion are carefully traced. The pattern is terrifying.

Finally Mr. Fr.-Chirovsky shows how cleverly the economic doctrine of Russia has been used to mask the national ambitions of the insatiable imperialistic appetites of Communist Russia.

When the author finally makes a statement to the effect that the United States is the only country left which can halt this monster, he makes every reader aware of the tremendous responsibility which world leadership has imposed upon America.

THE BILL OF RIGHTS. And What It Means Today. By Edward Dumbauld. 242 Pages. University of Oklahoma Press, Norman, Okla. $3.75.

BY LT COL FRANK E. BURDELL, JR., *Inf*

A solemn, thoughtful reappraisal of the first Ten Amendments to the Constitution of the United States, and their attendant political philosophies, takes on added significance today when peoples of so many lands are writhing under the fetters of an oppressive governmental system not of their own choosing.

This book assists in such a reappraisal by presenting a detailed account of the development of the Bill of Rights, and providing material on judicial interpretations which furnishes the reader a brief but reasonably comprehensive view of the extent to which our constitutional rights are protected by the courts.

Mr. Dumbauld's research apparently has been careful and complete, a fact revealed by the exactness of the material and the copius footnotes. Although handicapped because early Senate sessions were secret, and neither House kept verbatim records, he has been able to rely heavily on the writings of Madison, Jefferson, and other early Americans, the *Journals* of the House and Senate, and documents available in the National Archives and the Library of Congress.

While the author largely restricts himself to an analysis of carefully documented facts, it is interesting to note the thread of public sentiment occasionally revealed in the book. Of special interest in light of current domestic affairs is his discussion of the Fifth Amendment and its place in preserving the rights of the individual.

While probably excessively detailed for the average military reader, the book would prove invaluable to the student of the Constitution or the individual particularly interested in that specific aspect of early American history.

SCIENCE IN THE FEDERAL GOVERNMENT. By A. Hunter Dupree. 460 Pages. Harvard University Press, Cambridge, Mass. $7.50.

BY LT COL HOWARD L. FELCHLIN, *Inf*

In a skillful, detailed manner, Mr. A. Hunter Dupree has analyzed the relationship between science and the Federal government from the founding days of the Republic to the year 1940. Although many institutions and individuals have cooperated in the preparation of this book, the author frankly admits that "the history of science in the United States is still largely unwritten."

Science has played a notable role in making our governmental institutions and the American people what they are today. Beginning with the Lewis and Clark Expedition and the Coast Survey, Mr. Dupree has carefully traced the systematic use of science by the ever-growing, varied agencies of the Government. Many of the Nation's most illustrious names as well as countless obscure individuals brought science to Government in spite of personal sacrifice and inadequate reward.

Considered from a military viewpoint, it has become increasingly apparent that the full and effective use of science is a matter of vital necessity if a nation hopes to survive.

Through the years the Federal government has had a somewhat prid pro quo relationship with science. It has contributed to and encouraged scientific research and development while at the same time utilizing to advantage the fruits of scientific endeavor. From the creation of the Smithsonian Institute in 1846 to the establishment of the National Science Foundation in 1950, the Federal government has been a significant source of strength to science in America. Of particular interest is that prior to about 1870, the military services made invaluable contributions especially in the field of exploration to the cause of science in the United States.

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Air Forces

Ministerio de Aeronáutica, Academia de Guerra Aérea, Lima.

Ground Forces

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Portugal

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Uruguay

Biblioteca de la Inspección General del Ejército, Montevideo.

Venezuela

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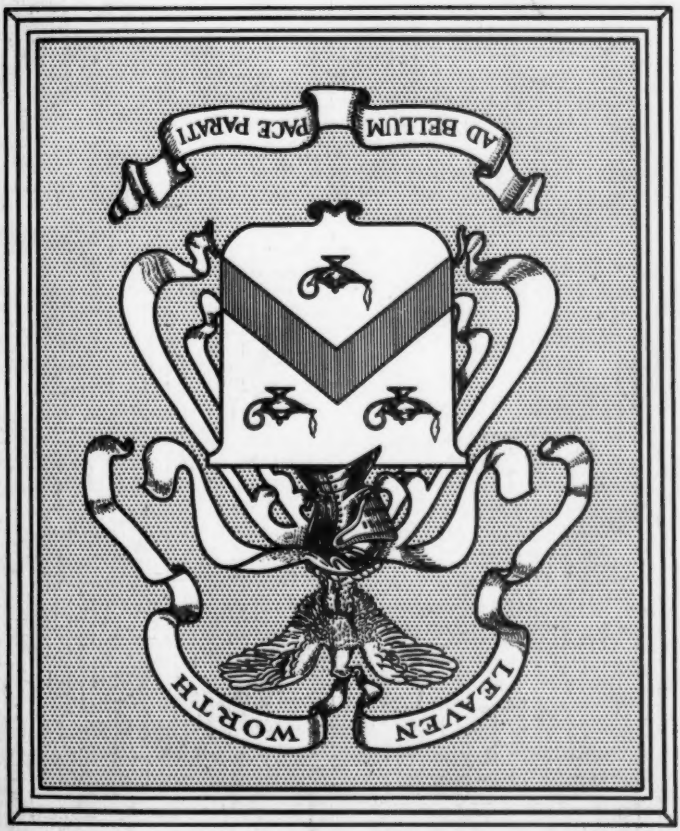
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